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ROENTGENOLOGY IN RUSSIA

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RUSSIA has always been out of the beaten track of European travel. The onset of the war and the revolutions which followed tended to further isolate it from the rest of the world, so that for a dozen years there has been but little contact between Russian science and that of the Western World. When, therefore, Professor Nemenow, who is the Director of the Roentgen Institute in Leningrad and President of the Roentgen Society of the Union of Socialist Soviet Republics, invited me to attend the meeting of the Russian Roentgenological Congress, it seemed to offer an opportunity to study the status of roentgenology in Russia. It seemed logical to expect that with their revolutionary ideas in art and politics there might be a movement in science or scientific organization which would be stimulating and provocative.

After a delightful visit to that dean of all roentgenologists, Professor Forssell, of Stockholm, we sailed in a little boat through the icebound Gulf of Finland to Helsingfors, from where we took the train to St. Petersburg, or, as it is now called, Leningrad. The social and political changes which have taken place in Russia are too astounding to be described perfunctorily. The outer world can scarcely appreciate them. One must actually come in contact with them to understand their significance. Suffice it to say that the overthrow of the whole political and social system which existed before the revolution has had its influence on science and the scientific worker. The service the physician renders being essential to the very existence of the State, no change in the social structure can be made without deeply affecting his economic status and influencing his work. In Russia, the whole hospital system is now everywher governmental and the scientist is main tained by a stipend he receives from the hos pital, organization or institution to which h gives his services. There is practically n private practice and medical aid is free t all of the working class.

The Congress which I attended was th fourth since the Revolution of 1917. It wa held in Leningrad, at the Roentgen Insti tute, of which Professor Nemenow is th Director, from May 21 to May 26. Ir spite of the fact that many of the papers had to be abbreviated, the sessions of the Congress were continued a day longer than anticipated. Over 350 roentgenologists from every part of Russia were present. One was impressed with the rapt attention with which the Congress followed the demonstrations and the reading of the eighty-two papers. Never have I seen such eagerness to learn, such intensity of purpose, such patient, serious consideration given to presentations at a scientific meeting. There appears to be in Russia to-day only one religion—Science, and everywhere one sees evidence of the striving of the masses for education.

The Roentgen Institute is located in the northeast section of the city, on the right

bank of the great Neva River, whose mouth forms a series of little islands upon which the city is built. Viewed from a height Leningrad seems to float on the waters of the Gulf of Finland. The section in which the Institute is located is reached from the main city by a long bridge, the Troitsky, from which one gets glimpses of the city—vast, cold, gray, even in the light of a spring sun. The Fortress of Sts. Peter and Paul looms at the end of the bridge and awakens many memories of the historic characters who died in its subterranean dungeons, while the golden domes of the cathedral, where lie buried all the czars since Leningrad was built, reflect the sunlight and relieve somewhat the somber grayness of the picture.

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Professor Nemenow told me that until 1912 roentgenology as a science did not exist in Russia. It was not taught at the Imperial Medical School, and even at St. Petersburg most of the large hospitals were unprovided with X-ray departments.

Students at the end of their medical course had no knowledge of the use of the X-ray in diagnosis or therapy. A few clinics had small X-ray equipments for their practical needs and applied only to the simplest problems. These departments were nearly always housed in dark, hot basements and were poorly equipped. But little money was allotted for the maintenance of these small laboratories. It was due entirely to the personal efforts and contributions of some of the physicians that these laboratories continued to exist. The Government had no interest whatever in this work. The question of the founding of a chair of roentgenology was introduced several times in the deliberations of the Imperial Counsel of Medical Education. Each time decision on the question was postponed.

Nemenow cherished the idea for many years of creating a roentgenological institute, with clinical and experimental services. Just before the Revolution he undertook tentatively the organization of such an institute in the Peter and Paul Hospital, and submitted detailed plans which were considered by a special commission of the Medical Counsel. Much was said and still more written about the plan. Though the foundation of such an institution was considered very urgent, nevertheless nothing came of it.

After the Revolution, in the Spring of 1918, Nemenow laid the project before the Commissioner of Public Instruction of the Soviet Republic. It was received with the keenest interest and, without useless conversations—without delay—it was promptly sanctioned. The new Institute was installed in the buildings in possession of the Commissioner of Instruction, which it now occupies. The Soviet Government has taken the most active interest in the Institute, and, as a result of the energetic co-operation on the part of the Commissioner of Public Health, all the necessary equipment was provided.

The Institute is organized on a new and unique basis, on a plan which is bound to give results that will make for progress in roentgenology. Our X-ray departments are adjuncts to such and such a hospital service or clinic. In other words, they are subsidiary to the clinical service. The Institute of Roentgenology was made independent, with its own clinics and laboratories. The idea behind such an organization is that roentgenology renders the highest type of medical service and, therefore, should be permitted a free and independent development. Research is considerably hampered when the X-ray department is part of a busy hospital service, because of the routine demands made upon the department and the lack of co-operation. There are many physical, biochemical and clinical problems with which the X-ray department should concern

itself. A well trained roentgenologist clearly sees these problems and can intelligently direct research towards their solution. The Institute has three purposes: research, instruction and practice. It is, first of all, a great laboratory for research, in the application of the X-ray as a diagnostic agent and in the physical, biochemical, and practical problems of therapy. This is the principal purpose of the Institute; all practical problems are subordinate thereto. But the realization of such purpose is possible, says Nemenow, only in an independent institute of roentgenology. For their solution, both the diagnostic and therapy problems naturally demand clinical material. An ambulatory service is not sufficient. Thus a large service of several hundred beds is a part of the Institute. The collaboration of different specialists being indispensable for its work, the Staff therefore consists not only of roentgenologists, biologists, and chemists, but of surgeons, internists, gynecologists, urologists, etc. The direction of the activities lies entirely in the hands of the Chief Roentgenologist, Dr. Nemenow.

At the present time there are three services: a ward service for adults, of 120 beds; a ward service for children, 60 beds, and a large polyclinic. The ward services take patients for X-ray and radium treatment as well as for X-ray examinations. The hospital is fully provided with the necessary equipment for all major surgical operations. Patients, who, after X-ray examination, have been shown to need operation, are operated on in the Institute.

There are two fine operating rooms in the clinic, one of which is so arranged as to permit operating under direct fluoroscopic control, as for extraction of foreign bodies. This operating room is also adapted to the application of X-ray treatment to open wounds.

All clinical methods are, of course, utilized, as in a general hospital, and there are ample chemical and pathological laboratories in the Institute.

The children's service takes and keeps till cured cases of herpes, tonsurans, and favus, because their contagious nature renders such cases dangerous to the others in the school or asylum. Skin, glandular and bone tuberculosis are treated by combined therapeutic methods in the wards. While under treatment at the Institute, the children are also under the care and constant observation of experienced teachers, for the efforts of the nation seem to be concentrated on eradication of the tremendous amount of illiteracy which exists in Russia.

On the first floor of the building and in part of the upper floor are the twelve roentgenologic equipments. The rooms for examination and treatment are well arranged, giving good protection to the operators. To be independent of the city current, Nemenow has installed large dynamos and a battery of accumulators, which insures continuous energy supply.

The biological department consists of a number of small rooms adapted to special research. Here are pathologic anatomical, bacteriological, biochemical, histobiological, and botanical departments. Here also is an experimental operating room for clinical work and an X-ray room for examination of large animals. On the second floor is the museum. There, in illuminated cases, are both the radiograms and the mounted specimens. Here also are photographs and models of the cases treated by X-rays and radium. This makes a fine roentgenological museum. There is an excellent library containing the world's literature on roentgenology and allied subjects.

Dr. Nemenow's assistant, Dr. Reinberg, speaks English perfectly and keeps the Staff posted as to American and English literature. They have—as have all Russians—a great admiration for America, and great

respect for American practicability and accomplishment.

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The papers read at the meeting may be divided into three groups: Those dealing with the practical problems of diagnosis; those dealing with the practical problems of therapy, and those dealing with biochemical research.

Among the outstanding papers on diagnostic problems was one by Reinberg and Armstam. The authors, by means of lipiodol injections, examined the uterus and tubes in 55 cases. They clearly demonstrated the presence of a sphincter at the uterine end of the fallopian tube, as well as the existence of definite peristaltic activity of the tube itself. They also demonstrated the mechanism whereby the uterus expels its contents. They maintain that this method of examination—"metrosalpingography"—is important from a diagnostic standpoint as a test for the permeability of the tubes and the differential diagnosis between uterine, ovarian and tubal conditions.

There were other papers on this same subject by Dillon and Braudy (who used 20 per cent iodopine as contrast material) and also by Ginsburg and Strockov. Reinberg and Armstam's paper was accompanied by the demonstration of very fine radiographs, illustrating peristaltic activity of the fallopian tubes and uterus.

There were several papers on pneumoconiosis. Abromavitch, Valshavsky and Scheinin reported on 120 cases suffering from siderosis and chalicosis, and illustrated the difficulties of the differential diagnosis between these diseases and tuberculosis.

Lieberman, of Moscow, demonstrated many interesting radiographs of growths of the larynx and trachea made with a very soft tube. Lieberman maintains that this method rounds out the laryngological examination by showing portions of the larynx and trachea which cannot be seen by the usual examination.

Nemenow and Ossinskaya read a paper on the subject of myelography, based on 16 cases in which lipiodol had been injected into the subdural space of the vertebral canal. They demonstrated the value of this method in the diagnosis and localization of growths of the spinal cord and meninges and for demonstrating pressure on the spinal cord through diseased vertebræ.

There were several papers on cholecystography. Fluoroscopy of patients whose gall bladders have been outlined by the Graham method is generally practised in Russia on account of the difficulty in obtaining photographic material, though excellent films were demonstrated by Stern, of Saratov.

Hanovsky, of Leningrad, tried the French method of giving large quantities of sodium bromide. The results, though definite, were not superior to those obtained with the dye.

There was nothing very striking in the papers referring to diagnosis of diseases of the gastro-intestinal tract.

Arkassy, of Leningrad, studied the effects on gastric motility of the administration of alkalis. There was no constant effect either from sodium bicarbonate or magnesium usta, though the latter increased gastric motility and produced the emptying of the stomach more rapidly than sodium bicarbonate.

A contribution to the study of bone diseases was made by Rochlin, of Leningrad, in reference to the pathology of ossification of the extremities in endocrine diseases. The following changes were found: (1) Modification of ossification (either acceleration or retardation). (2) Perversion of the order in which the centers of ossification appear. (3) Disturbance in the relationship between endochondral and periosteal ossification. (4) Pseudo-epiphyseal ossification.

Raitz, of Moscow, found osseous changes in 80 per cent of the cases of congenital syphilis. These changes are so characteristic as to make the roentgen examination a

most important method of analysis when congenital lues is suspected.

The subject of diaphragmatic hernia and eventration was treated by Dillon and Gusterin. The latter reported four cases of left-sided diaphragmatic hernia, while Dillon pointed out that in eventration the affected dome of the diaphragm begins to rise even before the inspiratory effort is at an end.

Shterhman considered the importance of habitus in roentgen diagnosis and the necessity of studying the morphology of the various organs in the light of constitutional types. The splendid work of Mills, of St. Louis, seemed to be unknown to him.

Maguid, of Kiev, found a striking similarity in the sella turcicæ of twins, which was, however, not duplicated by the other organs, in spite of the fact that the outer features of the individuals were strikingly alike.

The lantern slide demonstrations were, as a rule, interesting, but the films from which they were made were technically not good. This is due to the paucity of good photographic material, though some of the radiographs were of excellent quality.

There were papers on the therapeutic application of X-ray to tuberculosis of the lungs, larynx and glands. Gasool considers roentgen therapy to be indicated in slowly progressive and productive phthisis. Small doses from 5 to 10 per cent H.E.D. are given during the period of three or four months, in from six to ten treatments.

There were several papers on the use of the X-ray in acute and subacute inflammatory diseases. The favorable effects produced are very striking, though in the inflammatory diseases in gynecology Archangansky advised caution until it could be proven that the X-ray would not produce a harmful effect on the ovary. Papers also discussed the use of the X-ray for psoriasis (roentgenization of the hypophysis), in favus (under chloral anesthesia), in nephrosis and nephritis, in parenchymatous keratitis, in cerebral tumors, in syringomyelia, in rhinoscleroma (70 cases, Krougnikova), in mouth cancer by emanations (60 cases, Nemenow and Grossman).

Holthusen (Hamburg) read a paper on "The Theoretical and Practical Application of the *R*-units Dosimetry in Germany." The author prefers the ionization method of measurement to any other. Based on experiments with eggs of ascarides Holthusen concludes that an equal number of dosimetrical roentgen units produces an equal biological effect, independent of the length of wave with voltages over 100 K.V. Franke (Hamburg) demonstrated a new measuring device constructed by Kustnet in accordance with the idea suggested by Holthusen. The measuring is carried out independent of the temperature, the air pressure, and changes of the electroscope, as each measurement is checked by a comparison with the constant radiation of radium.

The biochemical papers were of considerable interest and in this field it seems to me the Russian investigator has a special aptitude.

The following papers were read:

Reprev (Harkov): "The Effect of Roentgen Rays on the Synthesis and Analysis of Life Processes" gave the results of experiments of radiating the eggs of a fowl previous to incubation. Even a single radiation has a depressing effect on the synthesis of life processes and perverts their analysis. The chicken hatches later than normal, is poorly developed, possesses no vitality, its physico-chemical constitution contains nitrogen in a quantity below the average and is somewhat richer in H_2O than normal.

Krontovsky (Kiev): "The Effect of Roentgen Rays on the Spleen Tissue Studied *in vivo* and *in vitro*." The effects of roentgen rays on the elements of the cells do not depend only on the dose received by the cells, but to a great extent also on the function which the radiated cell is supposed

to exercise and on the environment in which the radiated cell is placed after radiation.

Yugenburg (Leningrad): "The Effect of Roentgen Rays on Nitrogenous and Chlorine Metabolism." The investigations were carried out on 56 guinea pigs, which were subjected to both small and large doses of radiation. It was observed that guinea pigs subjected to a dose of ½ H.E.D. showed a pronounced decrease in the amount of nitrogen discharged, showing that nitrogen was retained in the organism; in those subjected to a radiation dose of 1/10 H.E.D., on the contrary, the quantity of nitrogen discharged increased. Inverted changes were observed in the process of nitrogenous metabolism as a result of the effect of roentgen rays. The changes in quantity of nitrogen contained in the blood have shown that the retention of nitrogen takes place chiefly in the liver.

Reprev (Harkov): A detailed analysis of the quantitative and qualitative changes in the corpuscular elements in the blood of rabbits, which appear after radiation with various doses of roentgen rays. He also studied the changes in the fermentative consistency of the blood, in its viscosity and the effects of rays on the metabolic processes and gas metabolism.

Kotchneva (Leningrad) injected a solution of radium emanation into the blood and the gastric cavity of rabbits and examined the changes in the sugar content in the blood. In half an hour's time after an injection of the solution into the ear vein hypoglycemia could be observed, whereas after an injection of radon into the gastric cavity there was hyperglycemia.

Brullova and *Neelova* (Leningrad) studied the changes produced in the blood of guinea pigs by means of subjecting the spleen to various doses of radiation and splenectomy. These changes are expressed by moderately varying absolute figures showing leukocytosis and by a double crossing of the curves showing lymphocytosis and neutrophylia. The changes are similar after radiation and after splenectomy. The degree of this reaction depends to a much greater extent on the individual peculiarities of the animal than on the dose given.

Yasvoin (Leningrad) pointed out that in affecting a cell the radiation in the first place destroys chondriosomes; this is followed by plasmopicnosis, which is further followed by changes in the nucleus of the cell. Golgi's apparatus is the most resistant element of the cell and its destruction characterizes the death of the cell.

Nadson and *Gleichgewicht-Rochlina* (Leningrad), studying the effect of roentgen rays on the cells of an onion skin, have shown that the chondrium is the most sensitive amongst morphological components of the protoplasm. But not only do chondriosomes of two neighboring cells react differently to the effect of roentgen rays, but so do the chondriosomes of one and the same cell. The degeneration of chondriosomes manifests itself in swelling, vacuolization, dispersion of granules, lipophanerosis, and in the loss of their staining capacity.

Voskrascnsky (Kiev) radiated a fly (*Prosophila*) and concluded that roentgen rays, according to the condition of the cell, either produce on it an exciting or depressing effect. In either case the end-result is to accelerate the life processes and to produce premature senescence.

Philippov (Leningrad) subjected to radiation various fungi organisms. He believes that, when applied in definite doses, it is possible to produce constant changes which become hereditary. These changes do not, however, appear in all organisms because of the variation in sensitivity of the species. By applying the roentgen rays to *Fungi Nadsonia fulvescus,* Philippov discovered changes in the development of vegetative forms and chiefly in the sexual process. Sporogenous species lose their capacity of

forming spores. Part of these changes are inherited by a series of generations (31 generations).

Lazarev and *Lazareva* (Kiev). The functional changes produced in blood vessels by irradiation were shown by experiments carried out on the ears of rabbits isolated by Kravkov's method, after they had been subjected to the effect of roentgen rays. According to the length of time which had elapsed since radiation, and the dose received, the degree of excitation of the vaso-dilatating and vaso-contracting apparatus either decreases or increases. These changes do not appear to be specific, as they are also observed during inflammatory processes.

The same investigators also examined by means of a dermatoscope and pharmacodynamical methods, the skin of human beings subjected to radiation with X-rays. The functional changes in the reaction of blood vessels may be found after a dose as small as ½ H.E.D.

There was also a joint meeting of the Roentgenological Congress and the Gynecological Congress at the University Hall, for the discussion of the treatment of cancer of the uterus.

The equipment of the X-ray laboratories in the general and special hospitals in Leningrad and Moscow is poor as judged by our standards. The ingenuity of the roentgenologists, however, is everywhere evident in the utilization to the fullest of the limited means and apparatus at their disposal, in a desperate effort to keep abreast the times. Their poverty prevents the utilization of films with the prodigality with which we use them, but their fluoroscopic work is extensive and thorough, with little thought of protection. The wealth of clinical material at the various hospitals is colossal. There is not to be seen in any other part of the world such varied and interesting pathology in which the tubercle and the spirochete, malnutrition and bad hygienic conditions play active and predisposing etiological rôles.

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A vast city is Leningrad—this city which Peter the Great laid out in regal style with no thought of any limitation. It is low-lying, built on marshy soil, and now and then flooded by the waters about it. There had been such a flood from the spring freshets just before we arrived, and the sagging pavements in places still showed the effects of the inundation.

It was fascinating to wander at random through the streets, mostly deserted, of this strange city, to walk along the English quay, fronting the river, with its palaces and fine mansions with porticoes and balconies now empty and crumbling; to go across the great square before the Winter Palace, where Father Gapon led the Revolutionary masses to slaughter; to mix with the crowds on the Nevsky Prospect, at one time the busiest and most fashionable street of Leningrad, now dirty and colorless, or to visit the palace of priceless artistic treasures—the Hermitage.

The city is now but a shadow of its former self. One sees the phantom of what, from all accounts, was once a gorgeous town, brilliant with color and gay with activity. But now it is a moribund place in which the sound of gayety or laughter is not heard; a drab, monotonous city of wide streets, vast squares, endless rows of palatial buildings, but poverty-stricken and neglected. Cursed by war, famine and pestilence, it shows the effects of these at every turn.

But through every period of stress there shone the courage of the men of science. Even in the times of greatest misery, during the famine, in the cold, cruel Russian winter, they carried on and kept the torch of science burning brightly. The clinical and experimental work went on as usual. The animals had to be taken home and kept warm in the beds of the investigators, since

there was no heat in the laboratory at night nor any light. One cannot, therefore, help being proud of a professional kinship with these men and women who have carried on the best traditions of our profession at all times.

POST-OPERATIVE IRRADIATION OF BREAST CANCER[1]

By J. BORAK, M.D., Director of the Therapeutic Department, Central Roentgen Institute of the General Hospital at Vienna, Austria; Director, Prof. Dr. Holzknecht.

TRANSLATION BY HENRY R. WOLCOTT

POST-OPERATIVE irradiation of breast cancer, in which the results of a single individual case do not mean much and only the outcome in a large series of cases is significant, since in the individual case only bad results can be measured with any degree of certainty, had never been looked upon with favor in the Holzknecht institute. Post-operative irradiation *per se* is not a very rewarding indication in roentgenotherapy, not only for the reason that it raises for the roentgenologist a technically difficult problem, but it also imposes on him the burden of prevailing on patients to come at the proper time for the secondary irradiations, which extend over a very long period. He also frequently experiences considerable difficulty in getting the women, who feel perfectly well after the operation, to see the necessity of continuing the irradiations, whereas the surgeon's task is not only at once apparent but appears to be completed when the operation has been successfully performed.

However, in spite of the unfavorable circumstances surrounding post-operative irradiation in breast cancer, the method has never been absolutely discarded, mainly owing to the *a priori* assumption that roentgen rays, since they can destroy manifest breast cancer, must have also the power of preventing a recurrence of cancer. Such an assumption was unfounded, as was shown by the statistics published by Perthes in 1921. Roentgen irradiations do not necessarily prevent recurrences, but, as has been proved beyond all doubt, may even, if carried out in a certain manner, favor the appearance of recurrences. The error of such post-operative irradiation lies in the fact that the neoplasm, following a radical operation, is treated, not as containing only latent cancer cells, but as if a perfectly manifest cancer were being irradiated; that is to say, with as heavy doses as possible and the treatment extending over as short a period as possible. The researches of Perthes have shown, however, that, if a mode of post-operative irradiation that differs in principle from the irradiation employed in manifest cancer is used, a relative, or sometimes absolute, improvement in the operative results may be secured. A true example of this mode of treatment, which is fundamentally different from the one-stage irradiation with maximum doses, inaugurated by Wintz, is to be found in irradiation with small single doses, extending over a long period of time, as employed by Meyer in the Anschütz surgical clinic in Kiel, and also by Albers-Schönberg, and others. A clearer understanding of the theory underlying the favorable effect of irradiation carried out in the manner described was furnished by the plant experiments of Jüngling, from which it became apparent that cells in a state of latency are, to be sure, less sensitive to roentgen rays than active cells but that secondary irradiations also have a cumulative value, whereby it becomes possible by means of frequent irradiations with small fractional doses, which leave the healthy surrounding tissues intact, to apply a cumulative dose that is sufficient to destroy the latent cells.

In a general way, the difference between the mode of irradiation applicable in manifest and in latent cancer (latency being shown by the fact of late recurrences) may be summed up in the statement that the technic of irradiation in manifest cancer

[1]Privatdozent Haudek, serving as chairman of the Deutsche Rontgengesellschaft for the year 1926, selected this subject as one of the main topics for discussion at the Seventeenth Roentgenologic Congress, held in April, 1926. The present article is a further elaboration of remarks made by the author with reference to the Holzknecht institute.

should take on more of a surgical character, whereas the mode of irradiation in latent cancer resembles more internal treatment, for the manifest cancer, as an acute affection, is either completely cured (which cannot be fully established, to be sure), or it becomes a chronic affection with a tendency to recurrence, which accordingly is to be treated intermittently over a long period of time, after the manner of internal diseases.

As the mode of treatment that had always been applied in the Holzknecht institute to breast cancer, following a radical operation, was exactly the same that Meyer himself used, we were compelled to assume that we were on the right track which would lead to an improvement in the operative results, and, in spite of the disadvantages surrounding the indications, mentioned at the beginning of this article, we did not think that we should relinquish our technic; so, troublesome and unrewarding though it promised to be, we decided to develop it further.

The technic of the irradiation applied in the Holzknecht institute to breast cancer following radical operation consisted in the application to three fields (operative scar area, axilla and supraclavicular fossa) of a dose of 8 H each, with a 4 mm. aluminum filter and a spark gap of about 30 cm. The three irradiations were given on three successive days, the whole series being applied three times at intervals of three weeks. Then the intervals were gradually lengthened, but the irradiations were continued—often for a period of two years. Our technic has since undergone the following modifications: The irradiation is applied in one field to the scar area, axilla and supraclavicular fossa, target distance 40 cm.; in addition, a smaller field is added to include the posterior aspects of the axilla, target distance 30 cm.; 6 H, or ½ H.E.D. erythema dose, with 4 mm. aluminum filter, 150 kilovolts. The irradiation is given eight times within twelve months; at first twice at intervals of two weeks; then twice at intervals of four weeks, and twice at intervals of six weeks, and the last two times at intervals of eight and ten weeks, respectively.

Owing to the fact that the appearance of patients for post-operative irradiation was not very carefully controlled, many came for the first few treatments but did not come again. That is possibly the reason why our results were not quite so good as were recorded in Kiel, where 57 per cent of the patients were free from recurrences for a period of five years, at least.

According to investigations that I have made with reference to the cases in which post-operative irradiation was carried out in our institute during the years 1919 and 1920, the results have been as follows:

Of the twenty-six patients receiving post-operative irradiation in 1919, nine, or 34 per cent, were still living, free from recurrences, in 1926; that is, more than six years since the operation.

Of the thirty-seven patients so treated in 1920, seventeen, or 46 per cent, are well after the lapse of five years since the operation. Thus, of the total number of sixty-three patients, twenty-six, or 42 per cent, are still living, free from recurrences and metastases, after from five to six and a half years. Six patients, or 10 per cent, had died without any recognizable recurrence of cancer. Of those who have disappeared no account has been taken.

On comparing the operative results as shown by statistics collected from Europear and American literature, which reveal an average of 35 per cent of patients going three years and 25 per cent living five years, without a recurrence, it is evident that the post-operative irradiations in our institute have brought about an improvement in the results of the radical operation. Confirmation is thereby given to Perthes' conclusion that the technic of the post-operative irradiations has exerted a decisive influence on the final results and that the one-stage irra-

diations with comparatively small divided doses are advantageous, which view was supported by Eiselsberg, among others, in 1921, on the basis of the results secured from post-operative irradiations in his clinic. From the congress report of Sgalitzer, it may be seen that the Eiselsberg clinic has continued to obtain very favorable results from the method. It may be stated further that the following surgical clinics have approved post-operative irradiations: Basel, Berlin (Bier), Göttingen, Munich (Sauerbruch), Rostock (Müller).

The question as to whether post-operative irradiation in breast cancer is justified has, if we take the statistics of the larger clinics —some published back in 1921 and some since that date—been decided in the affirmative. If a definite technic for the irradiations is observed, post-operative treatment is amply justified, for it is not only harmless if the technic described is followed, but there is no doubt that it will effect an improvement in the operative results.

Whether the improvement in the results is so great that post-operative irradiation must be regarded as an imperative indication in every case, that is another question. The evidence does not support such a view.

The number of cures that can be effected in cases in which an operation is performed in the first Steinthal stage (movable tumor confined to the breast, without involvement of the axillary glands) is so considerable, provided the operation is radically done (about 85 per cent without recurrence during the first three years after operation, and 65 per cent during the first five years), that, one may almost say, it is *a priori* improbable that such number would be increased to any appreciable extent by post-operative irradiation.

The situation is different in the cases in which the operation is not performed until the second Steinthal stage is reached (tumor adherent to the underlying skin; possible involvement of the axillary glands). Here the percentage of cures accomplished by operation is much less. Study of the literature indicates that the average results amount to about 32 per cent without recurrence for a period of three years or to about 25 per cent for a period of five years. The operative results are, therefore, in need of improvement, and an examination of the statistics shows that, if the technic described is observed, it is in this second stage that a very considerable improvement in the operative results may be secured. In our series of cases 61 per cent of the patients operated on during the first Steinthal stage[2] (total number 18) and 35 per cent of the patients operated on during the second stage (total number 42) were living, free from recurrence of cancer, after periods ranging from five to six and a half years. The results could doubtless be improved still further if care were taken to get the patients to appear promptly for treatment and if the post-operative irradiations were extended over a sufficiently long period, whereby the total dosage received would be more likely to prove adequate.

In the surgical clinic in Rostock, by means of a radical operation, followed by irradiations continued over a period of years, 80 per cent of the patients in the first Steinthal stage were free from recurrences for a period of three years, and 41.7 per cent of the patients in the second Steinthal stage were likewise free from recurrences for three years or more. The surgical clinic in Kiel reports for the second stage 62 per cent as free from recurrences for three years or more, and 56 per cent for five years or longer.

On the basis of the reported statistics, therefore, post-operative irradiation must be regarded as indicated in cases in the second Steinthal stage.

Of three patients in our series that were operated on in the third stage not one sur-

[2]All cases in which definite information as to the exact condition of the patients is lacking have been classified as belonging to Stage 1.

vived the operation for a period of two years. Cases in the third stage (the supraclavicular glands being involved also) can scarcely be regarded as particularly suitable for a radical operation. They should, therefore, either be considered inoperable—and such patients should be treated only with roentgen rays—or, after an operation that falls short of being radical, should be subjected at first to intensive roentgenization and later to irradiations gradually diminishing in intensity. In any event, the technic for irradiations that is eminently successful for patients undergoing a radical operation in the second stage does not appear to be so effective in patients who have reached the third stage. Likewise, borderline cases may occasionally be encountered, in which, as Holfelder has already emphasized, sometimes one form of irradiation and sometimes another may be indicated.

It must be borne in mind, therefore, that the solution of the problem of post-operative irradiations consists in adapting the technic of the irradiations to the conditions existing before, during and after the operation. That is true not only of breast cancer but also of all other tumors.

OBSERVATIONS ON REDUPLICATION OF KIDNEY PELVES AND URETERS, WITH A CASE REPORT

By FORREST L. SCHUMACHER, M.D., PITTSBURGH, PA.

CONGENITAL anomalies of the kidneys and ureters are of interest to the urologist and to the roentgenologist: to the former, because of the unusual and baffling train of symptoms; to the latter, because of their bizarre appearance on the film. While the anomalies themselves are of no clinical significance, the fact that they are more prone to be pathological makes their detection all the more important.

Duplication of the ureters and pelves may be complete or incomplete, unilateral or bilateral. A duplicated ureter is almost invariably accompanied by a duplication of the kidney pelvis. In such cases the kidney itself may be fused or double, or of the horseshoe type.

The pelves seldom, if ever, communicate with each other. As a general rule there is a certain amount of renal parenchyma between the pelves—the amount apparently having direct relationship to the size of each pelvis. The size of the duplicated pelvis has a direct relationship to the normal superior and inferior calices, the lower being usually the larger. In fact, a small superior calyx placed rather high above the usual middle and inferior calyx should immediately arouse suspicion as to the possibility of a duplicated pelvis.

When the two renal pelves have separate paths of drainage the duplication may be said to be anatomically complete. A duplicated ureter to be anatomically complete should have two openings into or near the bladder.

Curiously enough, a branching ureter (incomplete duplication) usually divides at one of three places, *viz.:* junction of upper with the middle third, junction of middle and lower thirds, or just above the bladder wall. These points are frequently the points of crossing of the ureters when each has an opening into or near the trigone. Several cases are mentioned in the literature where the ureters were found lying parallel, enclosed in a common sheath.

When there are two ureteral openings in the bladder the lower one is often that of the ureter draining the superior pelvis. These openings are occasionally detected during cystoscopy. As a matter of fact the discovery of the duplication of the ureters and pelves is frequently made with the use of the cystoscope and from the roentgenogram. In Harpster's series of cases, forty in number, in only nine was the diagnosis accredited to cystoscopy and radiography. Braasch and Scholl added eight cases, and numerous other writers have reported fifteen more. The writer has reasons to believe that many more cases exist that have not been reported.

There are occasions when the otherwise normal ureter (duplicated) has an ectopic opening, in which the symptomatology is definite and characteristic. This is particularly true in the female. In the male, but two cases have been diagnosed during life (Kilbane).

In the diagnosis of these anomalies the closest co-operation is demanded between the surgeon, urologist and roentgenologist. The diagnosis is not always made at the first examination. Where the ureters divide just above the bladder wall, and there is no obstruction to the catheter, the urologist can have no suspicion as to the presence of the second ureter. If there are two ureteral openings on both sides of the trigone—other factors being equal—the detection is simple, but when the second opening is distal to the trigone it frequently escapes observation. Perhaps the first intimation of abnormality, then, is the unusually large amount of opaque media injected before the patient

Fig. 1. Complete reduplication of both kidney pelves and ureters. Hydronephrosis and hydroureter on right side.

becomes conscious of distress. The roentgenogram at this time may or may not reveal the reason for the abnormal capacity. A second or third examination may be necessary before the full amount of the opaque fluid is used to show the entire contour of the pelves and ureters. The advantage of fluoroscopic control of the contrast media in such cases is, of course, obvious.

The size of the shadow of the double kidney is often well within the limits of that of the normal. It occupies the same relative position. Its contours are often regular. Its mere appearance does not suggest abnormality.

A long narrow kidney is suggestive of double kidney. With no calices projecting below the line of the uretero-pelvic junction a double kidney is always a possibility (Mertz).

Two splendid reviews of the literature have been made recently, that of Mertz in 1920 and Harpster in 1922. The following case is reported as a matter of record and at the same time to stimulate others to report theirs.

Our case differs somewhat from those reported, in the following respects: The two pathological pelves are apparently of the same size and are on the same side. The branching of the ureters takes place on both sides just above the bladder wall.

CASE HISTORY

Mrs. I. C., colored; occupation, housewife; civil status, married; age, 28 years.

Present complaint: Increased frequency, nocturia, hematuria, and pyuria.

Onset and course: For past four or five years has noticed increased frequency. At onset, would urinate every fifteen minutes; at present, about every twenty-five to thirty minutes. When active, desire to urinate is increased; frequency in proportion.

Nocturia: Present also for four or five years. On an average, gets up to urinate five or six times each night.

Hematuria: Present at irregular periods. Noted first four or five years ago, and has recurred at irregular periods. Has been present three or four times in past month.

Pyuria: Has been told by physician that there was "pus in her urine."

Past medical history: Usual diseases of childhood. Denies gonorrhea and lues. *Past surgery:* None. *Family history:* Negative. *Menstrual history:* Began at 11 years. Regular. No dysmenorrhea. No leucorrhea. *Marital history:* Married four years. Husband living and well. One abortion, induced, at three months.

History by system: Gastro-intestinal tract, negative. Respiratory system, negative. Circulatory system: Has had pain in precordium at irregular periods. No dyspnea, no edema. Nervous system: No vertigo, headache. Genito-urinary system: As listed above.

Physical examination: Inspection reveals young female negress not acutely ill. Eyes:

React to light and accommodation. Nose: No gross obstruction. Mouth: Hygiene poor. Dentition bad. Tonsils not visible. Neck: No adenopathy. No thyroid enlargement. Chest: No abnormalities in percussion and auscultation. Heart: No murmurs or arhythmias. Abdomen: Liver and spleen not palpable. No rigidity. No masses. No hernias. No tenderness. Kidneys not palpable. Extremities: Negative.

Cystoscopy (January 2, 1924): Urine much less turbid to-day. On cystoscopic examination, there is still a marked cystitis, but much less edema around the left ureteral orifice. Was unable to pass a No. 7 catheter, but bougies up to the size of No. 7 were passed with some difficulty. This is the first time we have been able to get into the left ureter. Further dilatation of ureter should be made.

(January 9, 1924.) Urine still very turbid. No. 7 catheter readily passed into right ureter and specimen of urine collected. Very small bougie passed into left ureter with difficulty. Unable to insert No. 7 catheter. Patient's symptoms are improved. Urine sent to laboratory to be examined again for pus, culture, and tubercle bacilli.

(January 20, 1924.) Marked redness around both ureteral orifices, with edema. Small injected areas which look like small ulcers are scattered over bladder mucosa. Right ureter catheterized and bloody urine obtained.

(January 25, 1924.) To-day 3 mm. bougie passed into the left ureter. This is the first time it has been possible to get a large bougie inside this ureter. This was followed by a No. 7 catheter and pelvis of kidney irrigated with 1 per cent mercurochrome.

(February 1, 1924.) Urine still turbid. No. 7 catheter readily passed to both kidneys. Fifteen c.c. mercurochrome injected into the left kidney pelvis before patient experienced a sense of fullness. Forty c.c. injected into the right side. The capacity on the right side is undoubtedly increased above normal, but some of the mercurochrome escaped into the bladder around the catheter. Specimen of urine from right kidney sent to laboratory to be examined for pus. Urine from left side was too bloody for satisfactory examination.

(February 7, 1924.) Three mm. bougie passed to left kidney without difficulty. No. 7 catheters passed to both kidneys and pelvis injected with 1 per cent mercurochrome. Left pelvis held 6 c.c.; right pelvis, 12 c.c.

(February 14, 1924.) Three mm. bougie passed into the right ureter without difficulty. No. 7 catheter passed to the right kidney and two test-tubes of turbid urine drained continuously from the pelvis of the kidney showing dilatation of the kidney pelvis. No. 7 catheter passed to the left kidney. Specimen of urine clear from the left kidney. Intermittent flow. Thirteen c.c. of 1 per cent mercurochrome injected into the right side without feeling of fullness or pain.

(February 21, 1924.) No. 7 catheter passed to the right kidney and 26 c.c. of fluid injected before patient complained of fullness. Fluid was sodium iodide and pyelogram was taken.

(February 28, 1924.) Catheter inserted a short distance into each ureter. Patient taken to X-ray room for pyelogram. Seventy-two c.c. of sodium iodide solution injected into the right side before patient complained of fullness. Twenty-five c.c. of solution injected into the left side and pyelogram taken.

(March 14, 1924.) Left ureter catheterized. Catheter inserted but a short distance. Patient taken to X-ray room and pyelogram taken. Twenty-six c.c. of solution injected before patient complained of fullness. Urine sent to laboratory for pus, culture, and tubercle bacilli; also injection of guinea pig.

(March 15, 1924.) B. 1688-1689. Urine from bladder (preliminary report), Gram-positive coccus.

(April 10, 1924.) Patient cystoscoped. No. 7 catheter passed into the left ureter for a distance of about two inches. She was then taken to the X-ray room and a film taken after the injection of sodium iodide solution.

(May 16, 1924.) Urine from bladder (final report), numerous pus cells. No organisms seen. Guinea pig inoculation, negative for tubercle bacilli.

ROENTGEN REPORT

(December 20, 1923.) There is a dilatation of the upper third of the right ureter, with none of the opaque fluid showing in the pelvis of the kidney. No evidence of urinary calculi demonstrated. A large portion of the opaque fluid is collected in the bladder.

(February 21, 1924.) There is a marked dilatation of the right ureter from the ureteropelvic angle downward, apparently to about the crest of the ilium. There is a dilatation of the pelvis of the kidney, primary and secondary calices, suggestive of pyonephrosis, with hydro-ureter.

(February 28, 1924.) There is a duplication of the pelvis of the right kidney (double kidney), with complete duplication of the right ureter. Both pelves and all the major calices are dilated, with rounded ends of the secondary calices, as usually seen in hydronephrosis.

Both ureters on the right side are dilated throughout, the one from the inferior pelvis measuring 2.2 cm. at its greatest width. This dilatation is not incompatible with a diagnosis of hydro-ureter. From the appearance on the film it is quite evident that the left kidney pelvis is not completely filled. There is enough shadow to demonstrate the second pelvis on the left side and the complete duplication of the ureters. There is no definite evidence of pathology demonstrated in the left kidney or ureters.

CONCLUSIONS

The combination of pyuria, hematuria, and nocturia is not enough to suggest anomaly.

Pyuria and hematuria would have been sufficient in themselves to mask the appearance of the trigone and prevent the discovery of a second ureteral opening had there been one.

The dilatation of both right ureters and pelves accommodated so much of the fluid that the second and third examinations were necessary in order to delineate the entire tract.

Even with 26 c.c. of fluid injected into the right ureter there was no hint at the first roentgen examination as to anomalous formation.

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THE ROENTGEN RAY IN UROLOGY[1]

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THE renaissance in urology followed closely upon three great discoveries—that of the cystoscope, that of the renal function test, and, finally, that of the roentgen ray. With the judicious application of these several aids, urology, at least in so far as its diagnosis is concerned, has developed to a degree hardly approached by that of any other special branch of medicine. A very large share, if not actually most, of this progress in the diagnosis of diseases of the kidney, ureter and bladder has been made possible through the advent of the X-ray.

The plain roentgenogram alone has taken the entire subject of urinary stones out of the field of rank speculation and classified it with the near-exact sciences. A very certain, though much overrated, value has come to be attached to the diagnostic significance of the renal outline as revealed in the plain roentgenogram. Of far greater moment than either of these, the visualization of the outline of the cavity of the urinary tract by means of the cysto-, uretero-, and pyelogram has come to be the "open sesame" of urological diagnosis.

Like most great blessings, however, that of the roentgenogram in urological diagnosis has come to us not entirely without potentialities for grave danger. There is nothing farther from my mind than denying or belittling to the slightest degree the immense worth of the roentgenogram to the urologist. Just to the contrary, I am deeply interested in stressing the various points that tend to enhance the value of the X-rays to this specialty.

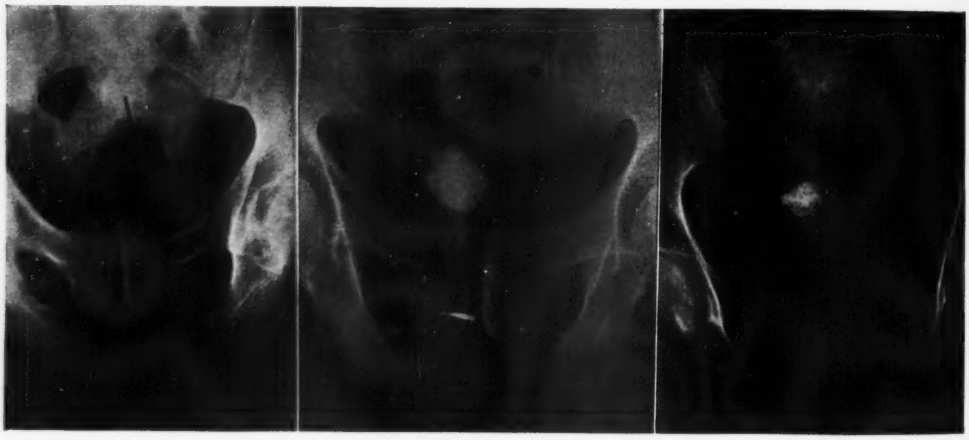

Fig. 1 (see p. 482).

If permitted a certain latitude with the subject assigned me, I should like to take up the matter of urinary lithiasis, with special reference to its roentgenological aspects.

The consistency with which stones of the urinary tract cast clear and definite shadows on the X-ray film at once makes such a means of investigation absolutely para-

[1]Read before the joint meeting of the Section on Radiology, Wisconsin State Medical Society, and the Outagamie County Medical Society, at Appleton, Wisconsin, April 6, 1926.

Fig. 2 (see p. 482).

mount in the diagnosis of this condition. In fact, the greatest danger of error in the diagnosis of urinary stones lies in the very ease and simplicity of radiography. That may seem somewhat of a paradox until one stops to consider that not all shadows suspected of being stone shadows are caused by urinary stones, and that, after all, urinary stones are not always a disease in and of themselves but are frequently found occurring simply as a complication of more fundamental urinary pathology.

If bitter experience has been the teacher of any one outstanding lesson in diagnosis, that lesson has been "never to cut corners." The diagnostician, whether he be urologist, radiologist or what not, who depends solely upon the plain roentgenogram in the investigation of urinary stones not only does so at the risk of occasional grave error but in so doing fails miserably in an appreciation of the real worth of the roentgen ray in urology.

The danger in the diagnosis of urinary stones by the plain plate lies in two things.

In the first place, shadows are frequently encountered on a film mimicking closely those produced by urinary stones and yet the result of some one of a number of other factors. Phleboliths, enteroliths and calcified lymph nodes are but a few of the many extra-urinary causes of shadows easily confusible with those produced by urinary stones.

In the second place, the mere knowledge of the presence of a stone is but a small

Fig. 3 (see p. 483).

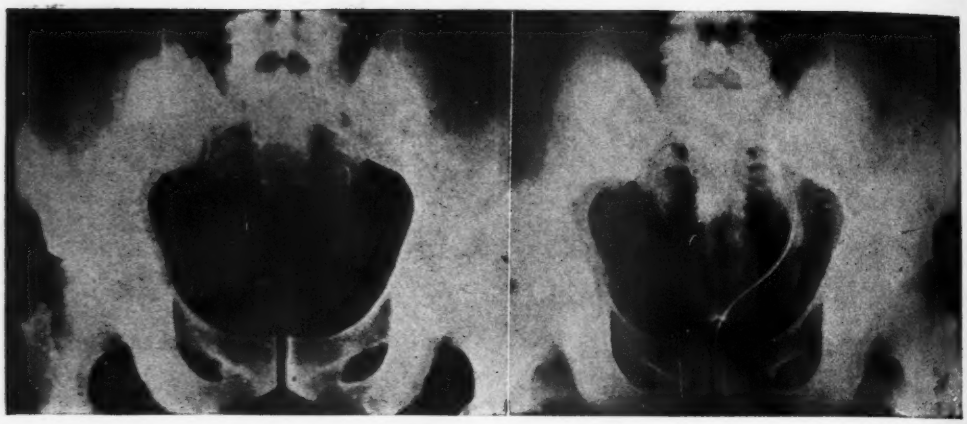

Fig. 4 (see p. 483).

part of the information necessary in the management of a case of urinary lithiasis. In a large number of cases of stone, especially stone in the kidney, it is of nearly the same import to know where the stone lies in the kidney and what is the condition of that kidney as to know of the presence of the stone itself.

With your permission, I should like to run through a series of slides illustrating the common types of misinformation at times given by the plain roentgenogram, the ease and simplicity with which such errors may be avoided, and, finally, the vast amount of information hidden within the plain plate to be revealed only by the pyelogram.

FIGURE 1

Stones in the bladder are not easily mistaken. A persistent large shadow near the midline and just above the symphysis almost invariably proves to be that of a bladder stone if the patient is a man. The most common confusion in cases of persistent large shadows in this region is that of a calcified ovary. There ought to be no confusion. Women seldom have bladder stones and men never have ovaries. Except when found around a foreign body, stones in the bladder of a woman are distinct curiosities.

Two of these cases are stones in the male bladder. The one in which the shadow is seen more posterior is that of a calcified ovary. This woman would certainly have been spared an utterly useless cystotomy had the diagnostician realized the danger of relying upon plain radiography. A cystogram in this case would have proved the shadow to have been extra-vesical and therefore not a bladder stone.

FIGURE 2

Shadows in the region of the lower ureter are more easily confused, due to the common occurrence of phleboliths in this region. Phleboliths do not usually look like stones. They are small, rounded, with sharp margins and are of an even consistency. They are usually multiple and tend to occur nearer the margin of the pelvis.

In this plain plate a single small round shadow is seen which does not look like a stone but, because of its location, must be proved not to be one. The plate taken after the passage of a shadow-casting catheter up the ureter on that side clearly shows

the shadow to be away from the catheter and hence not in the ureter. The shadow is undoubtedly that of a phlebolith.

FIGURE 3

In this case a number of suspicious shadows are seen, two of them lying suspiciously

Fig. 5 (see this page).

close to the shadow of the ureteral catheter. They, however, might be an inch or two behind or in front of the ureter and simply happening to lie in line with the catheter. To avoid such an error, stereoscopic plates must be taken, or else, as in this case, the ureter filled with a shadow-casting solution by injection through the catheter. The ureterogram here shows the lumen of the ureter to be but slightly larger than the catheter and certainly not including either of the shadows.

Fig. 6 (see p. 484).

FIGURE 4

This shadow certainly looked suspicious. The ureterogram proved it to be without the ureteral lumen and therefore not a stone. A check-up film the following day failed to show the shadow. I leave it to you to guess what caused the shadow.

FIGURE 5

The finger-like part of this shadow seen above the sacro-iliac joint was noted on the plain film. This view was obtained after passage of the ureteral catheter and injection of a shadow-casting solution into the ureter. It proved the original shadow to have been caused by a large stone within the ureter, and, of even greater importance, to be completely blocking the ureter, else the solution would have been seen running past the stone to the upper ureter and kidney pelvis. It is also interesting to note that the ureter below the stone is exceedingly

Fig. 7 (see this page).

dilated, suggesting an obstructing stricture of the ureter in the region of the lower end of the sacro-iliac joint. It is entirely probable that, in this case, even this large stone simply represents a rather unimportant incident in the total destruction of this kidney from severe obstruction in the lower ureter.

FIGURE 6

This large shadow at the side of the lower part of the third lumbar body was found on the plain plate. Subjective symptoms strongly indicated ureteral stone. This uretero-pyelogram definitely proves the shadow to be extra-urinary; probably a calcified mesenteric lymph gland.

FIGURE 7

In a consideration of stones of the kidney, it might not be amiss to review a few of the important points of interest about pyelography. As you know, this pyelogram has been made by filming the kidney area after a shadow-casting ureteral catheter has been passed and some five or six c.c of a shadow-casting solution injected through the catheter into the renal pelvis.

This pyelogram is beautifully normal. The normal renal pelvis as revealed in the pyelogram lies at the side of the first lumbar vertebra. It is made up of two or three main branches or major calices. These in

Fig. 8 (see this page).

turn subdivide into several smaller finger-like branchings, spoken of as shadows of the minor calices. Please note that the ureteral lumen is slightly larger than the catheter in some parts and practically catheter-size at others. These fusiform bulgings are the result of normal peristaltic action.

FIGURE 8

The left pyelogram here is typically normal. The right shows the unmistakable signs of back-pressure of urine. A ballooning of the renal pelvis must result from back-pressure. This first becomes evident

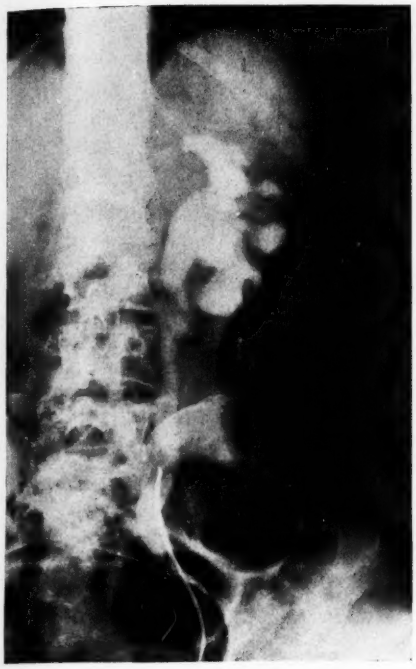

Fig. 9 (see this page).

by a clubbing or broadening of the major calices and an effacement of the minor calices, the entire picture giving the impression of increase in capacity of the kidney cavity. The fact that the ureter in this case remains normal is absolute proof that the obstruction lies at the junction of the ureter with the kidney pelvis. Were the obstruction somewhere down the ureter, it must necessarily also be dilated above the point of obstruction.

FIGURE 9

This pyelogram shows more advanced changes, the result of obstruction. The pelvic capacity is decidedly increased. The major and minor calices are distinctly ballooned. In this case the obstruction occurred in the extreme lower ureter at a point just above the lower edge of this film. With an obstruction at that point, the ureter as well as the renal pelvis must necessarily be ballooned. This is quite obvious here. May I call your attention to the marked angulation and torsion of this ureter. A ureter to be dilated in circumference must also be dilated in length. With its two ends permanently fixed, it follows that buckling and kinking must occur. A complete "S"-shaped kink is apparent in the upper end of this ureter. That this is not the cause of obstruction is proven by the presence of as much ureteral dilatation below the kink as above it.

FIGURE 10

The plain plate in this case merely tells of the presence of a shadow-casting substance looking much as if it were a small stone in the lower part of the kidney. The pyelogram not only proves the shadow to be that of a renal stone but, by comparative location, shows it to be in the lower major calix and most readily reached by nephrotomy rather than by pyelotomy. The pyelogram also shows the kidney to be otherwise perfectly normal.

FIGURE 11

The plain plate in this case shows a single small shadow in the region of the right kidney. The pyelogram proves this shadow to be a stone embedded within the parenchyma of the kidney. The outline of the pelvic cavity appears normal. The information given in this pyelogram is of exceeding importance. Had the stone been found lying within the renal cavity it might easily be expected to pass down the ureter and out. Failing that, it would certainly grow and just as certainly have to be removed to avoid irreparable damage to that kidney. Lying within the flesh of the kidney, it might reasonably be expected to do little if any damage to the kidney, and, un-

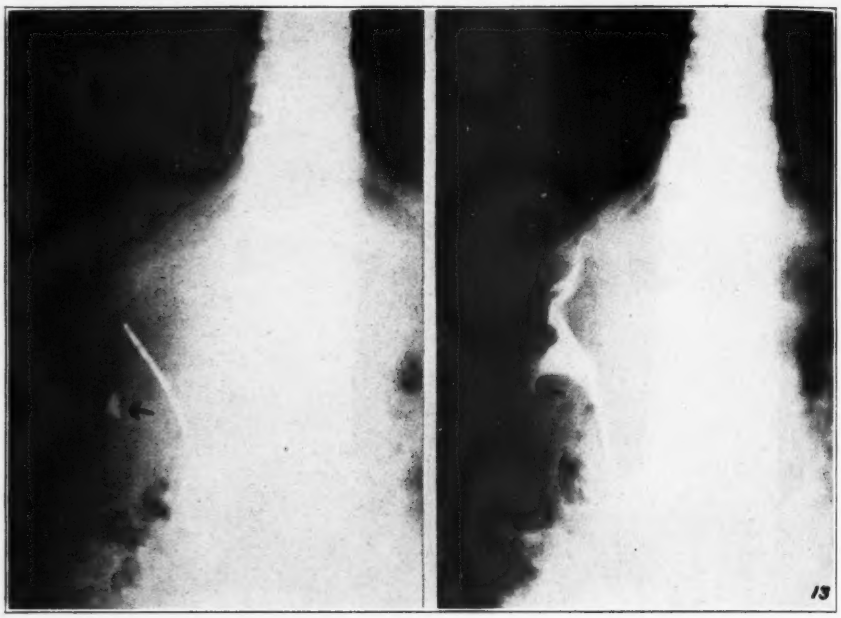

Fig. 10 (see p. 485).

less subsequently found to be growing rapidly, be left with neither harm nor discomfort to the patient.

FIGURE 12

This plain plate suggested the presence of a large single stone in the kidney pelvis. The pyelogram showed a perfectly normal kidney without any stone. This patient presented herself with pain in the left back and submitted a urine obviously bloody. Had she happened to have lain one inch to the left of her position on the table when the plate was taken, I have no doubt she would have been operated upon. Subsequent investigation proved this shadow to have been caused by a spot on the screen. When questioned, the patient admitted that she was menstruating at the time the sample of urine was collected.

FIGURE 13

A plain plate in this case showed a shadow strongly suggestive of a stone in the

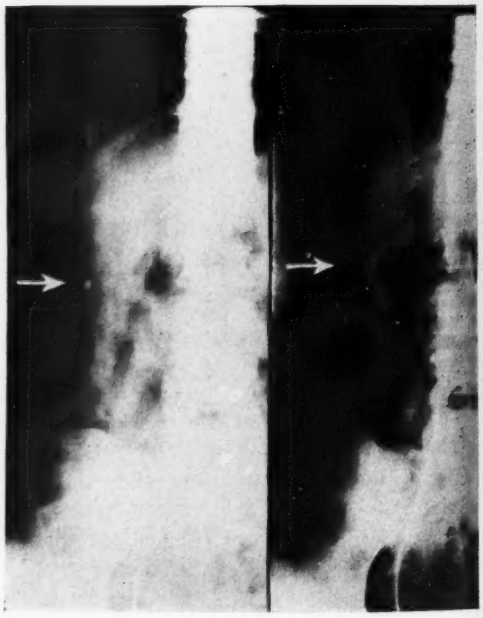

Fig. 11 (see p. 485).

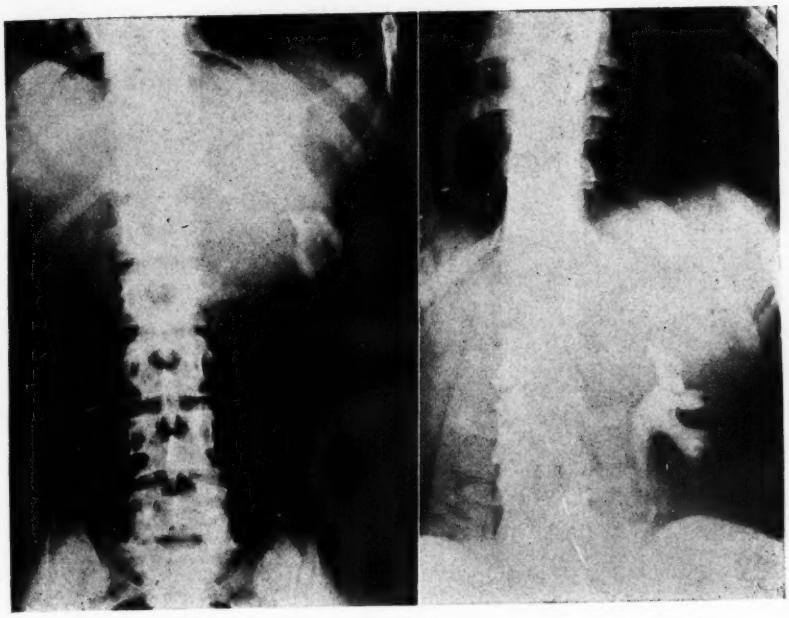

Fig. 12 (see p. 486).

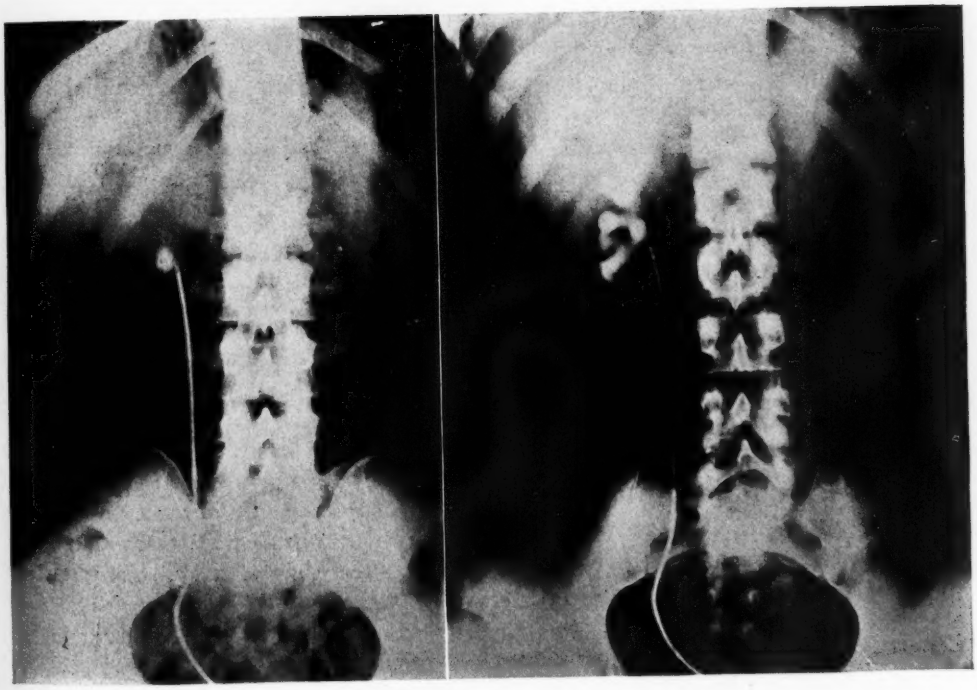

Fig. 13 (see p. 486).

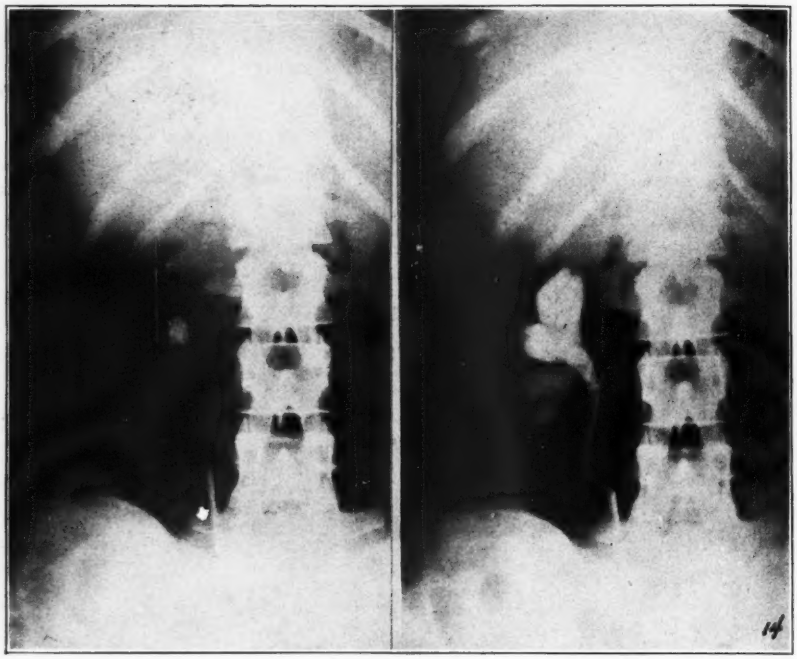

Fig. 14 (see this page).

renal pelvis. The exposure taken after passage of the shadow-casting catheter shows the suspected shadow and the catheter tip practically touching. The pyelogram shows the stone lying free in the renal pelvis, and the early, though unmistakable, signs of ballooning of the renal cavity prove that the stone, by a ball valve action at the mouth of the ureter, is seriously threatening the life of that kidney. Removal of the stone seems imperative and pyelotomy is suggested as the most practical approach.

FIGURE 14

This case is very similar to the preceding one except in that the degree of ballooning of the renal cavity is much farther advanced. Note the major calices practically obliterated. There is another point of interest to this film. Note the ureter dilated to practically the same width as the last rib. Such dilatation at once directs attention to the lower ureter as the site of an obstruction. This patient had a very definite stricture of the lower ureter. It is reasonable to suppose that the stricture occurred first, the dilatation of the ureter and renal pelvis second, infection third, and formation of the stone last of all. In the light of this pyelogram, mere removal of the stone would be but a small part in the treatment of this case.

FIGURE 15

This case is presented as a complement to the one just discussed. This patient (male) had had several kidney stones removed some seven years before these plates were made. The plain plate here shows at least three stones in the kidney which was operated upon before. The pyelogram tells us why. This degree of ureteral dilatation is irrefutable proof of a lower ureter ob-

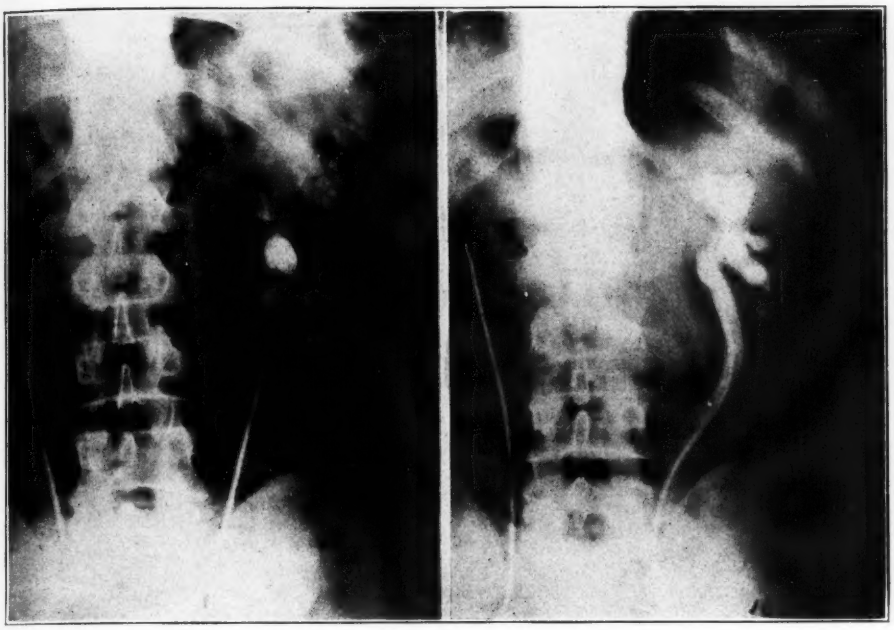

Fig. 15 (see p. 488).

struction. Here again, the mere removal of the stones would be but a small part of the treatment of this man's ailment.

FIGURE 16

This is another case illustrating the frequent association of ureteral stricture with

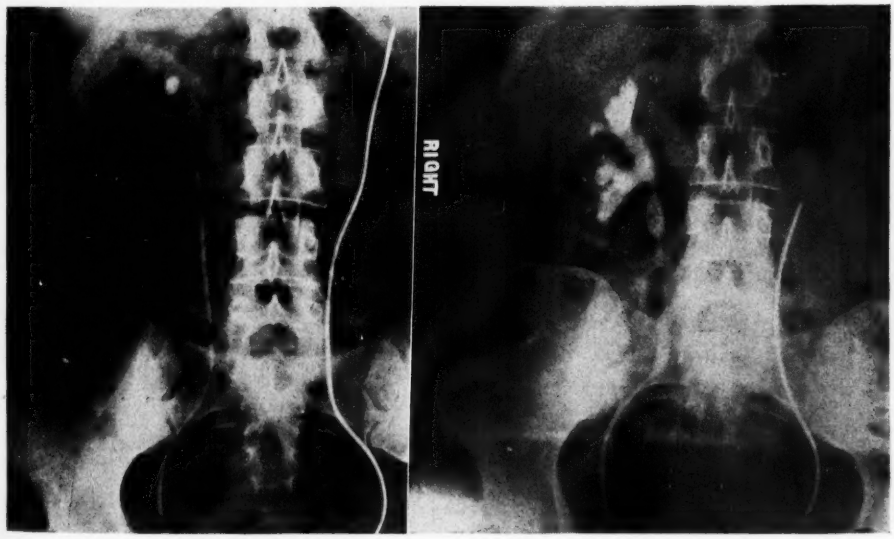

Fig. 16 (see this page).

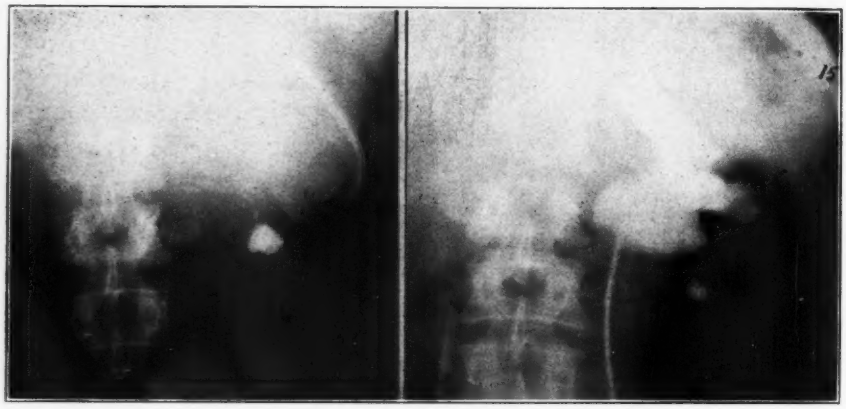

Fig. 17 (see this page).

stone formation in the kidney. This patient (female) had very severe attacks of right renal pain with intermittent hematuria. The plain plate showed a single shadow, suspicious of stone. The pyelogram localizes the stone in the upper major calix. Further than that, however, it demonstrates very beautifully the presence of multiple tight strictures of the ureter. It will interest you to learn that following the dilatation of these strictures by passage of this catheter, the patient was completely cured of her attacks of pain. So much so that she refuses to be alarmed by the knowledge of the presence of her stone. Had she been treated solely upon the findings in the plain plate her stone would have been removed at operation, her symptoms would have continued unabated, and like the man of the preceding slide, she would probably have returned in a few years with more stones.

Fig. 18 (see this page).

FIGURE 17

The plain plate in this case suggests a renal stone. The pyelogram shows the stone lying in the extreme lower calix of a kidney enormously hydronephrotic. One can readily imagine the prompt change in the surgeon's plans when confronted with this pyelogram.

FIGURE 18

This pyelogram is exceedingly interesting. The plain plate in this case is unfortunately lost. It showed a single triangular

shadow at the left of the third lumbar body. This pyelogram shows the same shadow to be one of a stone occupying and completely filling the left renal pelvis. Further than that, this pyelogram gives the unmistakable picture of cavernous renal tuberculosis. The large rounded cavities connected with the renal pelvis by a thin trickle of solution such as the upper one of these cavities can be nothing other than a tuberculous cavern with its fistulous connection to the kidney pelvis.

May I repeat, if experience has been the teacher of any one outstanding lesson in diagnosis, that lesson has been "never to cut corners." The diagnostician, whether he be urologist, radiologist or what not, who depends solely upon the plain roentgenogram in the investigation of urinary stones, not only does so at the risk of occasional error, but in so doing fails miserably in an appreciation of the real worth of the roentgen ray in urology.

CONGENITAL ABNORMALITIES OF THE STOMACH

WITH REPORT OF A RARE CASE

By D. A. RHINEHART, M.D., and B. A. RHINEHART, M.D., Little Rock, Arkansas

ALTHOUGH the stomach probably varies more in its shape, size and position, within normal limits, than any other viscus of the body, developmental or congenital anomalies are uncommon. Of the cases reported in medical literature, some of those of hernia of the stomach through the esophageal opening in the diaphragm, a few of transposition of the stomach, a few of bilocular or hour-glass contractions, and those of congenital diverticula, are the ones which can, with certainty, be classed as congenital malformations. Our case of inverted stomach, probably developmental in origin, adds a fifth type, and warrants a brief discussion of the subject and a rather complete case report.

In a 4.9 millimeter human embryo the stomach is found above the liver and behind the heart at the level of the fourth cervical segment (1). In an embryo of 11 millimeters it is located in the mid-thoracic region, extending from the third or fourth to the seventh or eighth thoracic segments. In an embryo of 17 millimeters it has completed its descent to its permanent position, reaching from the tenth thoracic to the first or second lumbar segments. Should this descent either partially or completely fail, the stomach will develop either partially or entirely within the thoracic cavity, producing a congenital hernia, which is the most common form of congenital anomaly of the stomach.

Bright (2) reports the finding at autopsy on a female subject of a stomach situated entirely within the thorax. The greater part of it, contained in a musculo-membranous sac probably derived from the diaphragm, reached as high as the fourth rib on the left side. The esophagus terminated in the cardia at the level of the fourth thoracic vertebra. From the left side the stomach passed behind the apex of the heart, where it was constricted, expanding again, but to a lesser extent, in the lower part of the right side of the thoracic cavity. The duodenum passed directly downwards through the diaphragm near the opening for the vena cava. Excepting the compression of the lungs, a dilatation of the right kidney pelvis was the only other abnormality found.

If the descent of the stomach is partial, its greater part will remain in the thorax, it will be constricted in its passage through the diaphragm, and the pylorus will be located within the abdomen. This type is described by Kinney (3) and forms the Type III of congenital diaphragmatic hernia of Hume (4). In the case reported by Kinney the fundus rotated towards the right instead of the left, two-thirds of the stomach being situated in the right side of the thoracic cavity.

Cases of hernia of the stomach through the esophageal opening in the diaphragm have been reported by Bevan (5), Knaggs (6), Healy (7), Morrison (8), Hedblom (9), and others. Some of these authors believe that these are acquired hernias, others believe them to be both congenital and acquired, while Hume considers them all congenital, the portion remaining in the hernia depending on the degree of descent. Those presenting larger portions of the stomach within the thoracic cavity, similar to those reported by Bright and Kinney, are undoubtedly congenital in origin.

Other varieties of congenital hernias of the stomach through the diaphragm, particularly those through the left arch, are probably all developmental defects in the diaphragm and not of the stomach. Bridges and Fawcett (10) report a case of this form in which the stomach was inverted and ex-

tended through an opening in the diaphragm, the greater curvature reaching the third rib. Roentgenograms of this patient's stomach are very similar in appearance, but not in location, to those of our case, but the esophagus was only slightly shortened, increasing the probability that descent was complete, the stomach developing within the abdomen.

Transposition of the stomach as a part of a transposition of all the abdominal viscera is not a rare anomaly. Transposition of the stomach only is very unusual. Upson (11) quotes Lochte as saying that only thirteen cases have been collected. Prince (12) reports a case of transposition of the stomach, pancreas, duodenum and colon. He says that the cardia was to the right, under the large lobe of the liver, leaving the inference, at least, that the liver was normal in position. Buis (13) recently described the findings in the examination of a boy whose stomach was to the right in the right hypochondrium. The esophagus passed to the right at the level of the eighth thoracic vertebra. The colon was not transposed. The stomach was the only organ shown by roentgenologic examination to be transposed.

Some of the older writers mention congenital hour-glass contraction or bilocular, or double, stomachs. Williams (14) reports the examination of ten pathological specimens that he considered as belonging in this class. Modern writers believe that most of these are either pathologic or due to musculature contractures. Gardiner (15), however, reports a case of undoubted hour-glass contraction of congenital origin. The specimen was from a three-months-old infant, the constriction being associated with an accessory pancreas.

Gray (16) believes that diverticula of the stomach may be congenital or acquired. Those described by Keith (17) were pathologic. Roentgenologic findings, as in reports by Gray and Emery (18), do not distinguish between those of developmental and those of pathologic origin. True congenital diverticula are probably rather rare.

Simple inversion of the stomach such as we have encountered appears to be a most rare anomaly. In a review of all of the available literature we did not find a report of a similar case.

CASE REPORT

Mrs. E. G. M., a widow, aged 65, was seen on December 3, 1925. She complained of defective elimination and a slight discomfort over the entire abdomen.

Family History: Her father died of estivo-autumnal malaria at the age of 56 and her mother of apoplexy when 78 years old. She has had four brothers and three sisters. One sister and two brothers are living now and in fair health. One sister died of tuberculous peritonitis, one of typhoid fever, one brother died of tuberculosis and one of "yellow chills," probably some form of malaria.

Personal History: The patient had whooping cough, measles and mumps as a child. She said that she suffered almost continuously from malaria. At one time her spleen became so large and so freely movable that it could be pushed around within the abdomen. She had typhoid fever at the age of 27. In 1916 she had a severe attack of what she called "nettle-rash" that covered her entire body, accompanied by a marked jaundice. She is the mother of one son who is now 28 years old and has "chronic indigestion."

The patient has been intermittently constipated for twenty years. Probably because of more exercise and more varied diet, this is not so marked in the summer as it is the rest of the year. She says that she has been bothered with heartburn all her life. Her appetite has always been good, but she has not been able to eat so hearty a meal as an ordinary person. She has had a mild degree of generalized discomfort and un-

easy sensations in the abdomen for twenty years.

Present Illness: Beginning in 1920 and since that time she has had numerous attacks of severe, cutting pains in the upper part of the abdomen, especially under the right ribs. These are of varying severity, occurring at irregular intervals. The pain is transmitted to the back under the right scapula. She belches occasionally. She vomits only when forcing herself to do so by irritation of the pharynx. She has not noticed clay-colored stools.

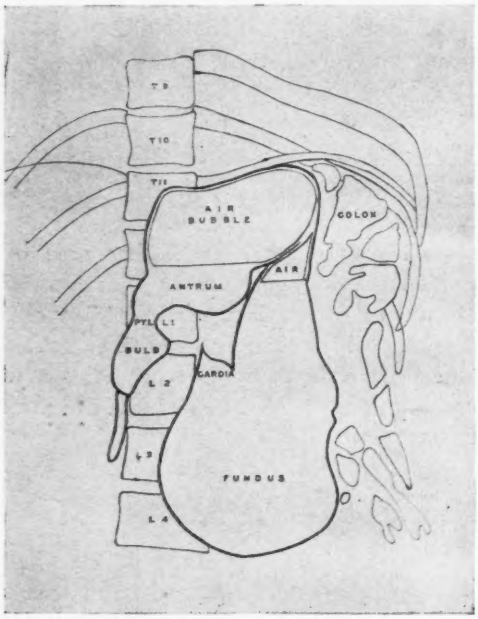

Fig. 1. Outline tracing of filled stomach, patient erect. The differences in the density of the lung and stomach bubble and that of the lower abdomen were so great as to make photographic reproduction impossible.

Physical Examination: The only abnormal findings in the physical examination of the head, neck and thorax was a marked pyorrhea alveolaris. The anterior abdominal wall was lax and fat.

There was a slight tenderness without rigidity over the whole abdomen. This was slightly accentuated over McBurney's point and marked in the gall-bladder region. There were no other abnormal physical findings.

Blood and urine examinations, including a Wassermann test, were either negative or showed only insignificant variations from normal.

Roentgenologic Examination: Complete roentgenologic examination of this patient's gastro-intestinal tract and fluoroscopy of the chest were done. No gross changes in the lungs, heart, or aorta were found. Chest expansion was equal and unrestricted. Films of the region of the gall bladder showed a very distinct shadow of the gall bladder, containing typical shadows of a number of small gallstones. The liver was normal in size and position.

The examination of the stomach by means of an opaque meal revealed a most unusual deformity, probably developmental in origin. With the patient erect, the esophagus passed through the diaphragm in the normal position (Fig. 1). It did not deviate to the left but was directed vertically, terminating in the stomach to the left of the middle of the second lumbar vertebra. The fundus of the stomach was directed downwards, its lowermost part reaching to the level of the highest point of the left iliac crest. The greater curvature of the stomach extended upwards to the left arch of the diaphragm, into the under surface of which it fitted accurately (Figs. 1 and 2). From the under surface of the diaphragm the pyloric portion was directed towards the right and anteriorly, terminating in a normal sphincter pylori anterior to the first lumbar vertebra. The duodenal bulb was in line with the pyloric portion of the stomach and, although its distal end was downwards, it retained an average quantity of the opaque meal.

The opaque meal, of course, gravitated into the fundus, the air swallowed with it rising under the diaphragm and forming a rather large air bubble (Fig. 1). When enough of the meal had been ingested to fill

Fig. 2. Radiograph of the filled stomach, patient prone.

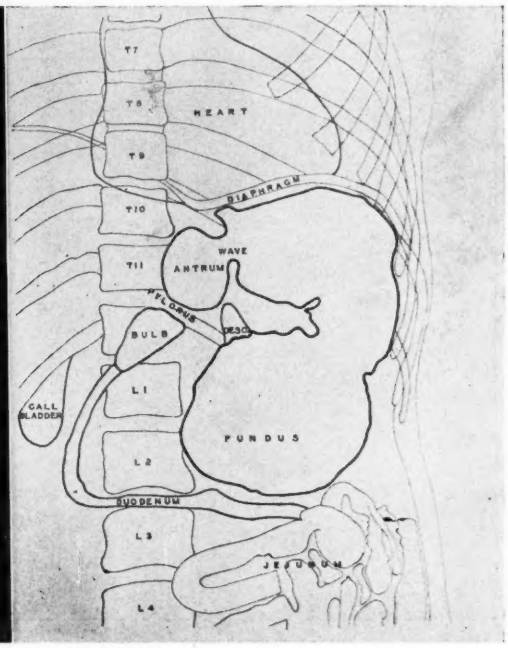

Fig. 2*A*. Outline tracing of the film shown in Figure 2.

the fundus and body, it flowed into the pyloric antrum. Peristalsis began at once. The waves originated near the most dependent part of the stomach, their point of origin being farther towards the fundus than is usually seen. Almost from their beginning the waves were deep, but they were not so numerous nor so rapidly moving as in an exaggerated peristalsis (Fig. 2). From their beginning the peristaltic waves passed upwards along the body and then along the pyloric portion. With the fluoroscope, in the erect position, these waves were seen to lift the barium mixture up into the air bubble. A very interesting observation was the squirting backwards into the air bubble of the barium meal when it was forced backwards by an advancing peristaltic wave. This patient's stomach did not present filling defects, decreased flexibility of its walls, absent peristalsis or any other finding indicating that it was in any way abnormal.

From the duodenal bulb the second portion of the duodenum extended vertically downwards to the level of the disc between the second and third lumbar vertebræ (Fig. 2). The third and fourth portions were directed horizontally towards the left, terminating, without a distinct flexure, in the jejunum. The coils of the jejunum were located in the lower left abdominal quadrant.

Five hours after the barium meal the stomach contained approximately 25 per cent of the opaque mixture. The pelvic coils of the ileum were filled and a considerable quantity of the barium had entered the large intestine.

The large intestine also presented a distinctly abnormal arrangement (Fig. 3). The cecum and ascending colon were normal. From the right free margin of the liver the large intestine extended upwards and towards the left in contact with the

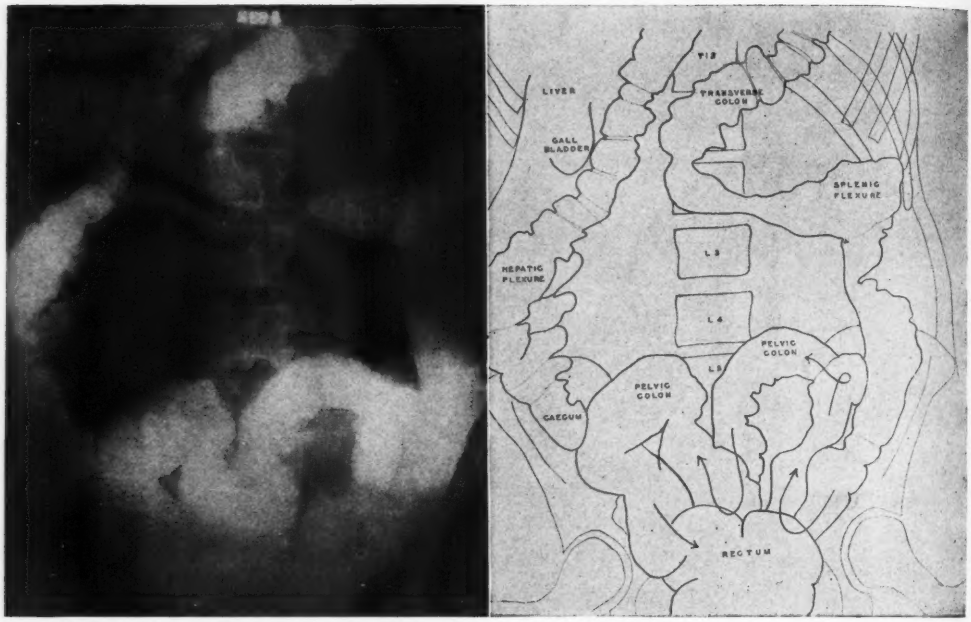

Fig. 3. . Radiograph of the colon, patient prone. In the erect position the colon was in practically the same position.

Fig. 3*A*. Outline tracing of the structures shown in Figure 3.

lower surface of the liver. It extended into the left arch of the diaphragm along the greater curvature of the stomach. At this place there was an acute bend backwards on itself, the gut extending to the right and downwards, forming a C-shaped loop across the first and second lumbar vertebræ. This loop passed anterior to the stomach and terminated under the left costal margin. The pelvic portion of the large intestine consisted of two coils, either one of which was as large as the usual pelvic loop.

Roentgenograms of the kidneys showed them to be normal in position, size and shape. We were unable to locate the spleen. The diaphragm was one centimeter thick on the left side and considerably less on the right side. Excepting for this increased thickness, its position, appearance and movements were normal (Figs. 1 and 2).

Subsequent History: Operation was advised and at first refused. Six weeks after the examination she began vomiting and suffered from anorexia, weakness and sweating. Two weeks later she was removed to St. Vincent's Infirmary and the gall bladder opened, the stones removed, and a drain inserted. Because of her critical condition, the incision in the abdomen was small and an exploration was not attempted. Improvement began at once, so that the patient was able to leave the hospital at the end of ten days. Four weeks later she again became critically ill and was returned to the hospital. Her chief symptoms were loss of appetite, weakness and constipation. Her mind became affected and a myocarditis developed. She gradually became weaker and died ten weeks after the examination. Permission for an autopsy was refused.

Discussion: This patient presented a rare form of congenital malformation of the stomach. In its development the stomach must have changed end-for-end by rotation around a transverse axis, the greater curvature and the pylorus passing forwards and

upwards along the anterior abdominal wall into the under surface of the left arch of the diaphragm. Apparently this occurred at a rather late stage in development. It probably took place after the descent of the cecum and after the large intestine had reached its adult form. The high position of the transverse colon and its intimate relationship to the greater curvature of the stomach leads us to believe that the great omentum had formed and that the colon was elevated as a part of the process which inverted the stomach. Because of a lack of abnormal roentgenologic findings in the stomach itself, we do not believe that the childhood malaria and enlargement of the spleen could have produced the deformity.

A remarkable feature of this case is that this patient should have lived to the age of 65 with such an inverted stomach, with as few symptoms as she presented. The uneasy sensations within the abdomen and the fact that she could not eat so hearty a meal as an ordinary person are the only symptoms that could be attributed to the stomach; the uneasiness was due to the peristalsis, and the lack of distensibility was probably due to pressure on the diaphragm. Vomiting must have been produced entirely by reverse peristalsis. In emptying of the stomach gravity did not play even a minor rôle; emptying was entirely a result of muscular activity.

It would be futile to even speculate as to the cause of this deformity.

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FAMILY DIVERTICULOSIS OF THE COLON[1]

By FRANK W. MACKOY, M.D., Roentgenologist, Sacred Heart Sanatorium, Milwaukee, Wisconsin

DIVERTICULA of the colon were described by Graser in 1898, and the first cases (5) reported by Mayo, Giffin, and Wilson in 1907. LeWald, of this Society, is credited with making the first X-ray diagnosis of the condition in 1914. Numerous case reports and articles on the subject have appeared in the literature during the last ten years.

In spite of the attention directed to these bowel defects and the ease with which they may be demonstrated by X-ray, their significance as possible trouble-makers has not been realized fully by the clinician and roentgenologist.

Of the sixty cases seen in our clinic during the last three years, some of them giving a typical history of acute diverticulitis, only one case had been diagnosed, clinically, prior to the X-ray examination. Needless to say, many of these patients had been subjected to one or more operations with only partial or no relief of symptoms. Clinicians and surgeons, however, were not the only ones at fault, as a number of the patients had had a previous X-ray examination of the gastro-intestinal tract.

The object of this paper is to report a family group whose history suggests the possibility of a hereditary tendency to the development of diverticula of the colon. As the English language literature makes but brief mention of heredity as an etiological factor, and contains no reports of cases occurring in the same family, this observation is considered of sufficient interest to be the subject of a report.

Family history: The maternal grandmother, mother, two maternal aunts, one cousin, a niece, and one sister of our patient had been gastro-intestinal invalids for years. Abdominal discomfort, distention, constipation alternating with diarrhea, and toxemia were chronic symptoms common to all. The chronic course of the disease was interrupted occasionally by severe, crampy pains in lower abdomen, fever, vomiting, and obstruction of bowels. The acute attack often terminated suddenly by a sharp, knife-like pain, followed by a stool containing blood and pus.

The similarity of the symptoms presented by the members of this family was so apparent that the intestinal trouble became a family tradition. The older members died without definite diagnosis being made, but three sisters of the third generation, two with marked gastro-intestinal symptoms and one in good health, had X-ray examinations, and all three showed multiple diverticula of the colon.

Case 1. M. A. G., aged 60 years, medium size, single, in good health, no history of gastro-intestinal trouble. X-ray examination showed several diverticula of the iliac portion of the colon, without constriction or other deformity of bowel.

Case 2. S. G., died at 53 years of age, single. Had attacks of sudden abdominal pain in early childhood. Typhoid fever at 15. "La Grippe" at 23, followed by intestinal trouble that continued until death, thirty years later. Numerous attacks of diverticulitis during that time. Several operations for drainage of abdominal and pelvic abscesses, obstruction of bowels, and one for constricted ureter. Diagnosis of "diverticulitis of colon" was made a short time before death by means of an X-ray examination and confirmed by autopsy.

Case 3. M. C. G., aged 53, single, a delicate, sickly child, subject to colds and tonsillitis. Pneumonia at 9 years of age. In-

[1]Read before the Radiological Society of North America, at Cleveland, December, 1925.

testinal symptoms appeared at 19 as pain in the abdomen, fever, nausea, vomiting, and diarrhea for two weeks with pus and blood in stools. Since the age of 19 she has had short periods of fair health between abdominal attacks. Symptoms of toxemia, nervousness, depression, and exhaustion have been prominent at times. Condition has been diagnosed as nervous indigestion, ptomaine poisoning, typhoid fever, walking typhoid fever, tuberculosis of the bowels, cancer, etc. Entered sanatorium April 24, 1922, emaciated, toxic, depressed, weighing 92 pounds (best weight 160 pounds).

Positive physical findings: Infected tonsils, gums, and right frontal and maxillary sinuses; subacute arthritis; valvular heart lesion. The abdomen was distended and tender, especially over the left lower quadrant. Rectal examination negative. Blood findings were those of secondary anemia without leukocytosis. Urine: trace of albumin; no blood, pus or casts. Stools: trace of blood; much pus, at times; no parasites. Stomach contents showed decreased HCl. The X-ray examination showed more than a hundred diverticula of various shapes and sizes in all parts of the colon, some of the sacs containing barium at the end of forty days.

SUMMARY

Eight members of a family, in three generations, suffered from a chronic intestinal trouble that presented similar clinical pictures in all cases.

By X-ray examination, the diagnosis of diverticulitis of the colon was established in two of the cases (sisters), and a symptomless diverticulosis demonstrated in a third sister.

DIAGNOSTIC INFLATION OF THE KNEE JOINT[1]

A CLINICAL-RADIOLOGICAL STUDY

By MAURICE A. BERNSTEIN, M.D., and ROBERT A. ARENS, M.D., Associate Attending Orthopedic Surgeon and Radiologist, respectively, of Michael Reese Hospital, CHICAGO

THE roentgenogram is a diagnostic aid of great value in bone and joint diseases. It reveals and confirms such pathologic changes as clinical medicine is often unable to visualize. In the early years of roentgenographic experience, one was unable to make a diagnosis from X-ray evidence alone. As a result of careful observation and study, however, the radiologist is frequently able to diagnose lesions without the contribution of clinical evidence.

With the refinement of instruments added to careful study, the possibilities of diagnosis have become boundless. There are still a large number of conditions where the X-ray findings are exceedingly limited, among which the knee joint figures very conspicuously. This limitation is not due to the fact that the roentgenogram does not reveal the existing pathology, but may be attributed to the lack of our own knowledge in X-ray interpretation of soft tissue changes. Clinical medicine helps to pave the way for X-ray interpretation, but without surgical aid confirming the actual presence of pathology, the existence even of gastric ulcer would not have been as well known as it is to-day. A sufficient number of knees have not been operated upon in obscure conditions to correlate the pathology with the X-ray findings. The hazy outlines and shadows, therefore, mean nothing. We are still unable to disclose, in a large percentage of cases, the presence of a torn cartilage; or to disclose or interpret with a great degree of accuracy the existence of changes in the synovial membranes.

In this paper we will deal with derangements of the knee joint which, under ordinary circumstances, present negative findings in the roentgenogram. Soft tissue structures do not readily cast a shadow unless considerable change has taken place, or some medium is introduced into the tissues

Fig. 1. Normal knee joint. (*A*) Suprapatellar pouch, normally assumes the shape of a gall bladder. (*B*) Posterior compartment of the knee joint, elliptical in shape. (*C*) Infrapatellar space, usually triangular in shape, with the apex at the patella and the base slightly irregular, due to the position of the cartilage. A, B, C, spaces filled with carbon dioxide gas.

to outline these structures. Liquids injected into a joint for diagnostic purposes are too irritating, often leading to adhesions, and are absorbed too slowly. Gaseous substances are preferable and therefore oxygen and carbon dioxide should be employed. Carbon dioxide has been used in our series of cases

[1]This work was supported by a grant from the Otto Baer Fund for Clinical Research. Paper read before the Radiological Society of North America, at Cleveland, Dec., 1925.

Fig. 2. Chronic synovitis showing the following: The suprapatellar pouch is distorted and has gas bubbles surrounding it. It is markedly diminished and has a slight septum stretching across the upper part. The posterior compartment (see *B* in Figure 1) is partially obliterated and fills irregularly. The anterior compartment is narrow and slit-like, being changed from the average normal by encroachment of a hypertrophic fat pad.

Fig. 3. Shows a diminution of the suprapatellar pouch, almost complete obliteration of the posterior compartment, and irregular filling of the infrapatellar space with a thickening of the fat pad. In addition, the gas-filled prepatellar bursa is shown, suggesting the possibility of a communication with the joint. Note the two compartments separated by a septum, evidently adhesions. *Diagnosis:* Chronic synovitis; prepatellar bursitis.

because it is very readily absorbed, producing very little irritation.

One must be familiar with the pathology which takes place as a result of internal derangements of the knee and determine if the roentgenogram reveals these changes. The knee joint differs from all other joints in the body in that it is purely a hinge joint, permitting only a small amount of rotation, and that only when the knee assumes the position midway between flexion and extension. This position is often called the "danger zone," because, when the joint is in this position, injuries take place which are of more serious consequence, namely, displacements and tears of the semilunar cartilages. The anatomical structures which as a rule show no changes in the roentgenogram are the synovial membrane, fat pad and the semilunar cartilages. The changes which are commonly seen in the articular surface of the bones are not sufficient in themselves to explain all of the existing pathology and symptoms. For example, the lipping and bony deposits upon the peripheral surface of the femur or tibia may not give rise to the symptoms complained of, but the pain, limitation of motion, and crepitus is more often due to changes in the synovial membrane, congestion and hyperplasia of the fat pad, and chronic synovitis, with its imposing changes.

ANATOMICAL CONSIDERATION

The synovial membrane of the knee joint is an endothelial serous lining which surrounds all of the interior of the joint, adapt-

Fig. 4. Shows a marked elongation of the suprapatellar pouch, with an irregularity at the femoral attachment. The infrapatellar pouch is narrow and discloses a small calcified area. The posterior compartment fills normally. *Diagnosis:* Chronic synovitis, with calcification.

Fig. 5. Anterior-posterior view of knee joint of a patient complaining of pains in the knee and presenting all the symptoms characteristic of a displaced semilunar cartilage. The film shows the internal cartilages in a normal position. It is interesting to note that the roentgenogram shows the relation between the internal semilunar cartilage and the internal lateral ligament, which is firmly fixed to the periphery of the cartilage.

ing itself to prominences and depressions. The joint is divided into two compartments, a small posterior and a larger anterior. The synovial membrane extends for about an inch and a half above the upper border of the patella. When the synovial sac is filled by an inflammatory exudate, all of the normal outlines of the joint are obliterated. A fold or pad can be seen stretching across the joint in the infrapatellar space, this pad being somewhat triangular in outline with the base directed to the center of the joint. The pad is held in position by a well defined ligament, known as the ligamentum mucosum, which extends from its apex upwards to the intercondylar notch in front of and blending with the anterior crucial ligament. Laterally the pad blends with the capsule and, in addition, is supported or suspended by two fibro-elastic bands called the alar ligaments. These anatomical structures are well demonstrated in Figure 1.

The conditions which require special diagnostic investigation are:

1. *Tears of the ligamentous structures of the joint.* The internal lateral ligament is more frequently torn than the external. When complete, this can be easily determined by physical examination, lateral mobility with the knee in full extension being the most pronounced finding. When, however, a partial tear occurs, the tear involving the inner free portion of the internal ligament, the diagnosis is difficult because the

Fig. 6. An enlarged and irregular suprapatellar pouch. (*A*) Normal filling of the suprapatellar pouch. (*B*) Normal filling of the posterior compartment. (*C*) Irregular filling of the infrapatellar space, with a dense visible pathological cartilage. *Diagnosis:* Chronic recurrent synovitis.

Fig. 7. Anterior-posterior view of knee of a patient complaining of pain and with a history of a dislocated semilunar cartilage. The film shows evidence of an arthritis of the knee joint, with chronic synovial changes, together with thickening, moderate calcification, and displacement of the cartilages which obliterates the normal spaces in the joint.

above described symptom may be lacking. Tears of the external lateral ligament alone are rare.

2. *Displacements and tears of the cartilages.* These are usually difficult to demonstrate in the X-ray film unless the cartilage has become calcified. It is then associated with other changes in the joint, chronic synovial thickening and possible formation of osteocartilaginous bodies.

3. *Chronic synovitis.* This embodies a large group of knee disturbances. The condition is more common in women, and, as a rule, involves both knees. The age of incidence varies from 36 to 60, and is frequently associated with the menopause. These patients present a general adiposity, the usual complaint being that the knees are "stiff" and painful, conditions which are usually worse in the morning. The knees have lost their normal outline, and present an increase in the subcutaneous fat, especially above and below the patella.

On opening such a knee one of three conditions is found to be present: (*a*) A simple hypertrophy of the synovial membrane and thickening of the fat pad, with a hyperplasia and elongation of the fat tags—hypertrophic villous synovitis. The capsule may be adherent to the articular surface of the femur, with bands of fibrous tissue stretching across the suprapatellar synovial sac. (*b*) This is an exaggeration of (*a*), with the presence of calcified areas. These vary from a pin size to that of a tooth-like process. These calcified areas may be embedded in crypt-like formations of the syn-

ovia. (*c*) A further development of (*a*), with the presence of osteocartilaginous bodies. These bodies may be single or multiple and may be analogous to the condition described by Henderson, namely, osteochondromatosis.

One of our patients who presented a vague group of symptoms showed a shadow in the X-ray film (Fig. 4), corresponding to the tibial attachment of the anterior crucial ligament. At operation a calcified area, the size of a pea, was found in the substance of that ligament. Another patient, aged 60, complained of a pain in her knee. The X-ray finding was that of an arthritis. At operation the synovial membrane was hypertrophied, disclosing numerous bands and a number of calcified areas (Fig. 2). Realizing that one could not depend upon the ordinary radiogram to disclose these soft tissue changes, it was decided to inject CO^2 into the joint, with the hope that some light might be thrown upon these obscurities. Kleinberg has used oxygen in the knee joint as a diagnostic aid, while others have used it for therapeutic purposes. One hears, however, very little of its use at the present time. From our own experience, having used it in about fifty cases, it appears to have a definite use as a diagnostic measure.

TECHNIC

The knee is carefully prepared for the inflation, using aseptic precautions, and the point for insertion of the needle determined. This is to the inner and lower border of the patella. The skin as well as the subcutaneous tissue is infiltrated with ½ per cent novocaine and a good sized needle is rapidly introduced into the joint. A little pain may be experienced should the bony surface be encountered. The gas is now introduced very slowly. The tubing must first be cleared of air by letting the CO^2 from the container pass through the tube before the latter is attached to the needle. Should the patient show signs of syncope withdraw the needle at once. The needle must not be handled unnecessarily, after it is once introduced into the joint, in order to avoid trauma of the synovial membrane, and to avoid irritating the bony surface.

A roentgenogram is taken before the CO^2 is introduced; 75 c.c. of gas is then permitted to flow in, when a gurgling sensation can be felt over the lower portion of the knee. This soon extends to the suprapatellar space. A soft crepitus can be elicited over the entire knee and the knee joint becomes distended. The needle is then quickly withdrawn, and a film taken in the same position as before. There is some pain connected with this procedure, but this is of short duration. The knee "feels heavy" and patients have a little difficulty in getting about. Most of the patients examined were from the out-patient department and all went home without assistance soon after the injection.

The interpretation of the films is of the utmost importance, verified by operation in many instances. The shadows which are found in the X-ray film may be explained on an anatomical basis. On examining an inflated normal knee joint the area above the patella, corresponding to the suprapatellar pouch, is well defined and takes the form of a gall bladder. The area between the articular surface of the tibia and femur, immediately behind and below the patella, is clear and slit-like. The space in the posterior compartment is clear and elliptical. Variation in outline and filling defects are brought about by infiltrative changes, with obliteration of normal contour and outline. When a synovial change occurs in the suprapatellar space the area is markedly diminished and appears irregular. One can often see bands stretching across that space. The most important and most striking change takes place in the region between the tibial and femoral articulation, below and behind the patella. Here the space should appear slit-like, in the

lateral view, with an occasional dipping-in corresponding to the anterior crucial ligament. When disease is present in the joint, this area may be completely obliterated or may be increased, as shown in a case of tuberculosis of the knee. In one of our cases a small cartilaginous body appeared, which was not seen as clearly before as after inflation. There have been no untoward results from this procedure in our series.

COMMENTS

1. The surgeon is often dependent upon the radiologist for indications to perform arthrotomy of the knee joint. The radiologist, therefore, must develop a method to bring out soft tissue structures.
2. Most knee joint derangements present a similar group of symptoms, *i.e.*, pain, swelling or effusion, lameness, possible limitation of motion, or locking. Visual examination by arthrotomy to disclose the existing pathology is too formidable as a routine procedure.
3. Pneumo-arthrosis, diagnostic inflation, is, therefore, a valuable aid in the differential diagnosis of these derangements. It is a simple, harmless procedure that can be employed in out-patient cases.

DISCUSSION

Dr. L. T. LeWald (New York): This is a very interesting subject and I think that more work of this sort ought to be carried out. Has the Doctor had any mishaps at all in the injection or from infection? I would like to ask if various positions have been worked out to determine the most desirable one to get the air to the highest point in certain instances.

I would also like to call attention to two cases I have seen of "double patella." There is a case of that sort reported in Grashey's Atlas. Almost always this separate center is on the outer side, and in our cases was present on only one side. If either patient had had an injury on that side it probably could have been mistaken easily for a fracture, although one would not expect to see a fracture of that particular type.

Dr. Arens (closing): I would like to add a word to the paper of Dr. Bernstein. This work was started some time ago, and the matter was brought about mainly by our inability to recognize many lesions of the knee joint that fail to show up on the roentgenogram. I feel that on seeing these films, one is offered a wonderful aid in diagnosis, and hope that possibly within the next year or so other observers will take this matter up so that a correlation of the findings can be recorded. It strikes me that it is an excellent procedure.

Dr. Bernstein (closing): I am sorry I had to hurry with the slides because they show conditions that can be discussed more extensively. Fortunately we have had no mishaps, so far, from insertion of the needle. Some patients complain of an unusual amount of pain, but I believe that this has been due to the irritation of the periosteum by the needle, and to nervousness. The attachment of the tube carrying the gas from the tank is done after the needle is in place. The gas is usually absorbed in about one or two days, and one can feel the disappearance of crepitus over the knee joint, when it occurs. The needle is usually inserted with the knee slightly bent; it should be inserted to the inner side of the patella and underneath it, because the synovial membrane is attached to the sides of the patella by means of the alar ligament, so that when one goes below the patella to the inner side one gets into the joint. One can tell when he strikes the joint because he can feel the air going into the joint. If one does not succeed in getting into the joint,

the air enters the periarticular subcutaneous tissue, along the muscles.

The diagnosis of these conditions can be greatly facilitated by co-operation of radiologists, working independently, and recording their observations. I earnestly recommend this procedure because of the small risk.

Etiology, symptoms and treatment of chronic duodenal ileus.—"Chronic duodenal ileus is not a rare condition," the author states. It usually occurs in visceroptotic individuals, and is characterized by attacks during which large amounts of bile-stained fluid are vomited, accompanied by such severe headache that a diagnosis of migraine is often made. The presence of pancreatic juice alone, or of both bile and pancreatic juice, in the vomitus is very suggestive. Tests of the vomitus for these constituents, the history, a somewhat characteristic tympany in the right upper quadrant, and, chiefly, roentgen-ray examination, are of value in diagnosis.

Four factors are mentioned in the causation: (1) Congenital abnormalities; (2) Factors favoring the formation of adhesions; (3) Factors favoring compression of the duodenum; (4) Factors favoring pelvic position of the intestines. It is considered by the author that visceroptosis and adhesions are the most important of these.

Five cases are reported in detail, and a series of operative and non-operative cases by tabulation. Operative treatment usually consists in simple duodenojejunostomy, a very safe and satisfactory procedure followed by excellent results. Medical treatment consists largely in efforts to relieve the ptosis by posture, support, and exercises.

CHARLES D. ENFIELD, M.D.

Chronic Duodenal Ileus. C. C. Higgins. Archiv. Surg., July, 1926, p. 1.

RADIO-ACTIVE SUBSTANCES: THEIR THERAPEUTIC USES AND APPLICATIONS

RADIATION OF MALIGNANCY OF THE MAXILLARY SINUS

By JOSEPH MUIR, M.D., New York City

ALL writers on malignancy of the maxillary antrum, quite irrespective of the angle from which they are viewing the subject, unite in deploring the fact that these growths seldom come under observation until the time for the successful application of any treatment has long since passed by. This is, unfortunately, true in regard to malignant neoplasms elsewhere located, for it is well known that delay in seeking treatment is one of the greatest stumbling-blocks in the way of cancer control; but for various reasons when a growth of this nature arises in the antrum, the time between its inception and the first applications of treatment is likely to be relatively longer than is the case with other types of neoplasia.

Thus New, writing in 1920, remarks that in a series of thirty-three malignant tumors of the maxillary sinus seen at the Mayo Clinic, fifteen were so far advanced that it was not thought that any treatment would be of benefit, and of eighteen cases treated by cautery and radium, "the lesion was so extensive that a resection of the jaw would not have been indicated." Quick notes that "the cases are almost invariably far advanced," and he is also of the opinion that if dentists and nasal specialists would exert themselves to detect incipient cases of malignancy, much might be gained, as patients are frequently given palliative treatment for inflammatory conditions, instead of resort being had to surgical measures which would lead to biopsy and consequent earlier recognition. Johnson says that accurate and early diagnoses are rendered difficult by the fact that the cancer in itself does not produce any very characteristic clinical signs, and the tumor must attain considerable size before it causes mechanical disturbances which direct the patient's attention to the gravity of his condition. When a growth is so completely hidden as it is in such a cavity as the antrum, the diagnosis is generally made too late for successful treatment. More than this, even when it is seen by those who should be competent to recognize it, a coincident inflammatory process may so predominate as to lead to a diagnosis of empyema of the antrum, or a polypoid condition, thus delaying the application of suitable treatment "until the neoplasm is hopelessly advanced."

Another source of confusion and delay in diagnosis is the fact that the pain, which is the first premonitory symptom, is not in any way characteristic, and because of its location is practically always referred to the teeth. As the tumor early causes irritation of the fifth nerve, there will be a tingling or itching over the cheek on the affected side, and this will often be followed by a sensation of pressure or weight in the sinus itself. This usually sends the patient to the dentist, and to relieve this "face ache," which is likely to be most severe about the alveolar process, a goodly number of teeth will in all probability be sacrificed, without, of course, bringing about any relief. While this is going forward the size of the growth will be steadily increasing, and eventually hemorrhage from the nostril of the affected side, or—in cases where there may have been a pre-existing infectious process more or less chronic in character—a muco-purulent discharge will offer conclusive evidence that it is not the teeth which are at fault.

But even then, the true condition will probably be overlooked, and more time lost in applying palliative measures for a sup-

posed inflammatory condition in the sinus. Hansen states that swelling of the cheek and puffiness about the eye without other inflammatory signs may be a fairly early symptom, usually not remaining constant, but of later occurrence than the pain. Actual swelling due to increase in the size of the tumor mass, or to its extension into neighboring structures, is ordinarily a late manifestation, appearing after there can no longer be any doubt about the actual nature of the disease.

It has so far been impossible to apply primary radiation to neoplastic growths in the maxillary antrum. It is essential that all the malignant tissue possible should be surgically removed, depending upon subsequent radiation to clean up whatever may have escaped the surgeon, and so sterilize any zone of potential invasion about the original site as to decrease, or, in fortunate cases, wholly obviate, recurrence. The conditions confronting the operator who seeks to remove a malignant growth from the antrum or any other accessory nasal sinus, are markedly different from those he will encounter in other parts of the body. Barnes describes these difficulties very vividly when he says: "In order to avoid the dangers either of implantation or of metastasis, in operating on malignant disease it is axiomatic that the tumor should be handled as little as possible, and should be removed by an incision through surrounding normal tissues, the growth itself remaining intact. Obviously this rule must be ignored in operations upon the sinuses, since no margin of normal tissue can be removed, and the tumor not only cannot be taken out intact, but must actually be removed piecemeal, and by a process of maceration."

The practice at different clinics and in various parts of the country naturally differs, but the value of radium in supplementing the efforts of the surgeon who must work under these unfavorable conditions admits of no question. At the Mayo Clinic the tumor is destroyed by the action of slow heat, a soldering-iron being carried gradually up into the antrum, attacking at whatever point the growth appears in the mouth, either through the palate or above the alveolar process. Following thorough cauterization, radium salts or radium emanation is introduced directly into the antrum, either immediately the operation is concluded, or from ten days to two weeks later. From one to two hundred milligrams of radium are applied for a period varying from twelve to twenty-four hours, within the sinus itself, while supplementary outside applications are likewise employed. Needles are occasionally used instead, the dosage depending upon the type of malignancy and its duration and extent.

A pre-operative "pack" treatment from a flat brass box containing glass emanation tubes held at a distance of 6 cm., so as to produce a slight erythema, is a device made use of at the Memorial Hospital (New York). This is applied not only over the antrum, but to the cervical glands as well. X-ray is sometimes used as a substitute for radium in this pre-operative preparation. The actual opening of the antrum is preceded by ligation of the external carotid, lingual and facial arteries. The avenue of approach to the site of malignancy is selected in accordance with the tendency of growth shown by the neoplasm; if the orbit is involved, the eye is enucleated, but when the tendency of growth is downward a large window is made in the cheek below. In some few cases it has been found necessary to make both exposures. Coagulation of the entire area with the high frequency cautery and removal with either the curet or high frequency cutting-needle is the method employed. Radium application is made immediately thereafter, and Quick emphasizes that if the radium is to be accurately placed the surgical exposure must be adequate. Bare tubes of radium emanation are enclosed in an ordinary finger-cot and placed in the area operated on. These are capable of

giving off from 35 to 40 millicuries in a time period varying from 48 to 60 hours. The caustic action of such a dosage is necessarily very great, so that the radium therapists at this hospital have now largely substituted gold emanation tubes, the filtration of which cuts off the caustic beta rays and avoids the production of the severe inflammatory reaction which always follows the use of bare tubes. About 15 gold tubes, of a value of from 2 to 3 millicuries, are commonly employed. In individual cases, larger tubes properly filtered can sometimes be packed into the cavity.

At the Huntington Hospital in Boston it is not considered necessary to ligate the arteries, packing being relied on to stop the always profuse hemorrhage. The front wall of the antrum is exposed and removed through an incision in the cheek. If the orbital tissues do not appear to be involved, the eye is left in place, but if doubt exists it is considered wiser to enucleate it. As soon as all visible malignancy has been removed a flap of skin overlying the anterior surface of the antrum is cut off at its base, leaving a wide triangular opening for subsequent observation and treatment. The cavity is then packed with gauze in the midst of which a steel tube containing radium emanation is embedded, the total dosage being from 500 to 1,000 mc. hours.

It is undoubtedly the patient's fear of extreme facial disfigurement which induces some operators to endeavor to clean out the antrum by an intra-oral approach, no matter how the growth may lie. It is, however, evident from examination of clinical experience under widely varying conditions, that persistence in such a course is a mistake. Malignancy of the antrum is a very grave disease, and speedy death awaits all those who do not receive prompt aid, with complete removal and thorough sterilization of all affected tissues. Anything approximating an adequate inspection of the antrum is impossible without a wide surgical exposure, and this can hardly be obtained without a good sized "window opening" being made in the cheek, though occasionally one of sufficient size can be contrived within the mouth. Most writers state that at first they were timid about exenteration of the orbit, as this not infrequently meant the destruction of a functionating eye, but as their experience accumulated they became convinced that the only hope of conquering the disease lay in the removal of all possible sites of recurrence, and that even in those cases where cure was not possible, the sufferings of the patient might be so great that the loss of the eye became by comparison a small matter.

From the point of view of the radium therapist, the large opening, permitting as it does accurate placement of the radioactive centers and frequent subsequent inspection, so that any signs of recurrence can be promptly detected, is unquestionably to be preferred. When the tumor has been reached through an intra-oral opening, inspection becomes much more difficult, for even if the opening be relatively generous, it is impossible to watch the lesion so successfully as through an opening upon the cheek. Inasmuch as continuous careful after-observation is of the greatest importance in all cases of antral malignancy operated on and radiated, the weight of this consideration will be appreciated.

The relative merits of the knife and the cautery as the instrument for eliminating the growth have given rise to some sharp discussions between advocates of the two methods. The cautery is preferred by workers at the Mayo Clinic, and apparently at the Memorial Hospital as well, while Barnes, of Boston—who is, to be sure, primarily a rhinologist—together with his associate, Greene, feel that the Moure technic which consists in cutting away all questionable tissue through a wide exposure, offers more advantages than any other method. Barnes is emphatic in stating that "practically regardless of anatomical considerations, every

particle of tumor tissue, all necrotic or soft bone, should be removed." On the other hand, Bloodgood, of Johns Hopkins, has asserted that his whole experience shows "that if a malignant disease is cut into by a knife or curet you might as well send for the undertaker."

When surgeons of international reputation differ so diametrically, it may be difficult for the radium therapist to decide upon the wisest course in any given case. In general, it is best for the same individual to remove the malignant tissue and to place the radium, for no other can so accurately determine just where radiation is most needed. This point is stressed by a number of writers, notably Blum and Greene.

In certain cases of carcinoma of the antrum treated at Mount Sinai Hospital, New York, by William Harris, extensive exposure was obtained by opening up a cheek flap, while entrance to the sinus was gained through the superior maxilla. The growth itself was curetted away, and when all visible tumor tissue had been removed, the cavity was lined by gauze upon which platinum filtered tubes of radium emanation were placed. These tubes were left within the sinus for a period sufficient to permit half decay—that is, approximately four days. The total dosage applied within the cavity amounted to from 35 to 40 mc. destroyed—that is 4,667 to 5,320 mc. hours. The wound in the cheek was kept open for several months, but no signs of local recurrence ever appeared, although two of the patients eventually died of metastasis to the brain. There is no doubt, however, that their lives were prolonged by the treatment.

Though a review of the literature regarding radiation of antral malignancy does not bring to light the records of any large percentage of patients who have survived the first appearance of the lesion for the required five-year period, we must not regard the outlook as hopelessly melancholy. Before the discovery of the therapeutic uses of radium, carcinoma of the antrum was invariably rapidly fatal, so that if radium never did anything more than alleviate the sufferings of these unfortunates as the end drew near, its use would be fully justified. The immediate results of surgery or cauterization have been so greatly improved by the post-operative employment of radium that there is every reason to believe that with greater co-operation between dentists, rhinologists and radium therapists, resulting in earlier diagnosis and more prompt application of treatment, we may hope within a few years to see this disease successfully combated; at present, it is one of the most uncontrollable of malignant lesions.

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CASE REPORTS AND NEW DEVICES

X-RAY FINDINGS IN A LARGE VENTRAL HERNIA

By J. E. HABBE, M.D., St. Vincent's Hospital, Norfolk, Virginia

Because of the impossibility of their demonstration otherwise, short of operation or autopsy, diaphragmatic hernias furnish a not very rare field of study for the roentgenologist. Ventral hernias, on the other hand, are seldom referred for X-ray study, since the diagnosis by physical examination is usually quite easy. The case reported here is a good example of the facility with which roentgen diagnosis can still be carried out when hindrances to physical examination are wellnigh insurmountable.

Mrs. A. S., aged 37, of Italian descent, whose weight was well over two hundred pounds despite a stature of only five feet three inches, had had a salpingo-oöphorectomy through a low midline incision in August, 1923, following which there was drainage through the wound for some weeks, the incision eventually closing over, however. Immediate post-operative recovery had been good, but in the past year the patient's weight had increased somewhat and for about six months there had been periods of right lower quadrant pain, associated with occasional nausea and vomiting. Constipation was severe.

Fig. 1. Anterior-posterior film showing all of small bowel on right side.

Fig. 2. Right lateral film of abdomen showing herniated ileum "in profile." (Dotted line indicates skin margin.)

Physical examination revealed a well

nourished, very obese patient, the condition being most marked on the anterior abdominal wall, where the fat sagged forward and downward like a short apron doubled back on itself. By physical examination it had

Fig. 3. Supero-inferior film made by projecting ray downward through pendulous anterior abdominal wall. (Dotted line indicates skin margin.)

been impossible to determine whether this "apron," which was bilateral although slightly more pendulous on the right side, was simply excess fat or a more definite herniation of abdominal contents within a peritoneal sac.

X-ray findings. Fluoroscopic study of the stomach was practically valueless because of the obesity of the patient. Film examination made in the standing posterior-anterior and right lateral and in the prone posterior-anterior and right lateral positions revealed the stomach and duodenum grossly normal. The upper jejunum showed no displacement or other abnormality, but almost the entire ileum was herniated forward and downward and occupied a constant position, entirely in the right half of the anterior abdominal wall. The bowel loops appeared to lie no deeper than an inch beneath the skin in this region. There was no demonstrable marked narrowing of the space occupied by the barium-filled loops of bowel in the upper part of the hernia, hence this suggested a relatively large "neck" for the sac.

At six hours the head of the meal was in the ascending colon. The herniated ileum was still well filled, and one or two loops showed apparent dilatation, suggesting relative constriction beyond.

At twenty-four hours the head of the meal had reached the rectum. The small bowel was entirely empty of barium at this time but some gas-filled loops of bowel were still seen to lie within the sac. The transverse and descending colons contained almost no barium, but apparently there was no protrusion of this portion of the bowel into the hernia.

Conclusions. The X-ray findings definitely confirmed the clinical suspicion of ventral hernia, the contents being made up of lower jejunum and almost the entire ileum.

Operative findings. The patient was operated on by Dr. Levi Old, July 8, 1926. The large wide-necked sac containing the jejunum and ileum was found as noted by X-ray study, the protrusion being midline between the recti, but overlying the right rectus as it pouched downward and to the right. Herniotomy was successfully performed and the patient made an uneventful recovery.

NON-SECRETION OF TETRAIODO-PHENOLPHTHALEIN

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Since the introduction of cholecystography by the method of Graham and Cole, a very great deal has been written on physiology of the gall bladder, chemistry of the drug, technic of administration and biliary circulation, and more lately on the various findings of many roentgenologists — of course, the greatest emphasis is laid on the negative result, that is, in the case where a gall-bladder shadow fails to appear. This result has been held to be positive evidence that there is disease in relation to the gall bladder or ducts. I have read of and also observed cases of acute jaundice where the gall bladder failed to show a shadow—

several of these later did fill and these we were forced to believe were cases of catarrhal jaundice. All our patients are given the dye intravenously, as our early experiences with capsules orally were dismal failures.

In the last six months two cases have been referred to the X-ray Department for cholecystography which did not show any shadow in the suspected region. Both of these cases were clinically suffering from gall-bladder disease. In both, the gastro-intestinal examination was negative. On both cases laparotomy was performed and in both cases the gall bladder was found to be normal in the gross—the wall not thickened, the color good, and the viscus emptied freely on gentle massage, but there was a large amount of disease in the neighborhood. The liver in both cases was very largely replaced by carcinoma. In one case there had been a carcinoma removed from the pelvis a few years previously; in the other, no primary growth was discovered. Neither of these patients showed jaundice. Both died within a couple of months of the laparotomy. I am reporting these cases, with short case histories, as I found them most interesting, and as I have not, to date, seen reports of similar cases in the journals. In one of Dr. Evarts Graham's early articles, he stated that the production of the cholecystogram depended on four things, the first of which was the secretion of the dye by the liver. These cases point out one way in which this part in the process may be interfered with, and thereby lead to faulty diagnosis of gall-bladder disease.

Case 1. Mrs. T. McA., aged 61. Beyond influenza and pregnancies, history was uneventful until three years ago, when she was operated upon for uterine cancer. Ten days ago she had pain in the right upper quadrant which required morphia. Vomiting and distention; W.B.C., 9,600. Gastro-intestinal examination negative. Cholecystography showed no shadow. Operation showed the liver to be studded with large hard masses over its upper and lower surfaces. The gall bladder was free, soft, and emptied readily. Case considered hopeless, abdomen closed in layers. Pre-operative diagnosis, cholecystitis, cholelithiasis; post-operative diagnosis, carcinoma of the liver.

Case 2. Mrs. A. L., aged 52. Ill for four weeks. Pain in right upper quadrant, vomiting, loss of weight. Gastro-intestinal examination negative. Cholecystography showed no shadow, W.B.C., 6,300. At operation practically the whole liver was found to be replaced by carcinoma; adhesions to the hepatic flexure; gall bladder not involved. Abdomen closed. Patient died in three weeks.

CHARGING DEVICE FOR ELECTROSCOPE

By ROBERT B. TAFT, M.D., B.S., CHARLESTON, SOUTH CAROLINA. From the laboratory of Dr. A. R. Taft and Dr. R. B. Taft

Those who have used an ebonite rod or a miniature static machine to charge an electroscope during wet weather realize that it leaves much to be desired. The step-up

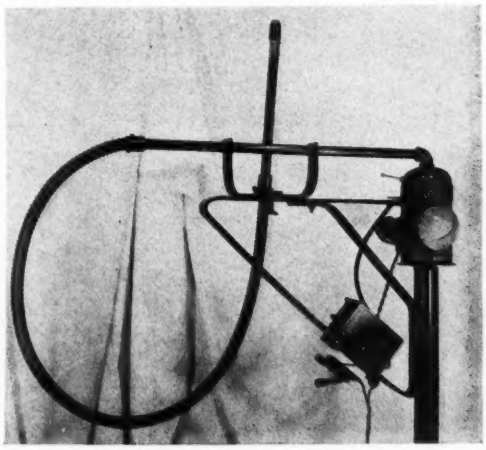

Fig. 1. The author's device for charging electroscope.

transformer operated on A.C. and using a vacuum tube rectifier is more satisfactory, but is complicated and expensive.

For the past six months the author has been using a simple and inexpensive arrangement composed of a Ford spark coil operated on two or three dry cells. This gives a high voltage direct current whose positive pole is connected to a fine needle point placed about three-quarters of an inch from the post that supports the leaf. This distance is much greater than the actual sparking distance of the coil, but allows a gentle brush discharge to take place, slowly lifting the leaf to the desired potential. By being lifted slowly (two or three seconds) the leaf is spared any sudden jerk, which might result in damage. No switching device is needed except a push button in the primary circuit.

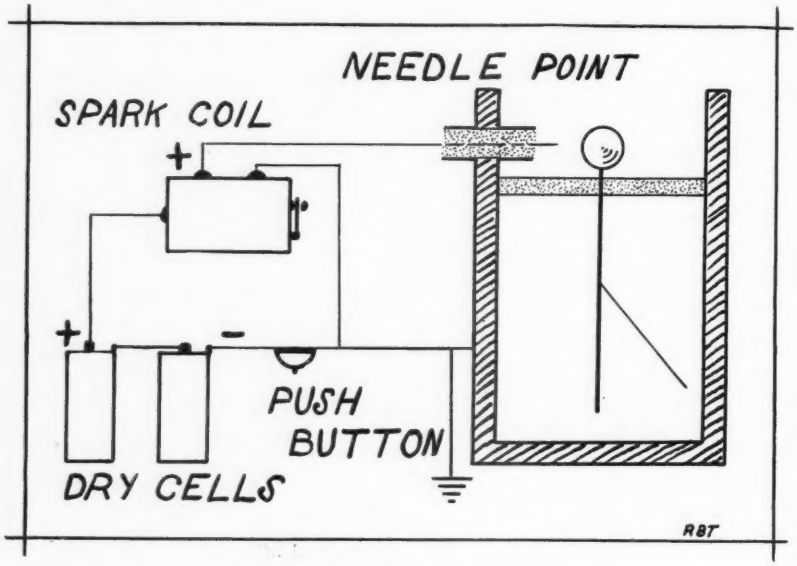

Fig. 2. Plan of charging device.

The accompanying photograph and drawing (Figs. 1 and 2) should be self-evident.

EDITORIAL

ROENTGENOLOGIC DIAGNOSIS[1]

As in medicine in general, so it is with roentgenology; in some cases, medical diagnosis is very easy, and in other cases it is difficult, or quite impossible. Some cases are just naturally obscure, uncertain and troublesome; it is in these that roentgenographic diagnosis is difficult of application. That is owing either to the fact that the symptoms of the disease are only slightly developed, or that the real disease takes on the symptoms of some other disease, the real disease being masked or concealed by a simulated affection. In atypical cases and in rare diseases, great difficulties lie naturally in the way of an accurate diagnosis. In addition, it must be said that the so-called rare diseases are, for the most part, in reality not so rare as is commonly supposed.

The success of a roentgenologic diagnosis in the aforementioned difficult cases depends on the co-existence of three distinct groups of pre-conditions:

1. A good knowledge of medicine—not only of general medicine (general anatomy, physiology, pathologic anatomy, pathology) but also special medical knowledge of the group of diseases that interest us from the practical standpoint. The roentgenologist should be familiar not only with the typical forms of the ordinary diseases but also the atypical forms; furthermore, with the rare diseases. If one knows little or nothing of a rare disease—possibly not even the name—one is, of course, absolutely unable to recognize a case if it should arise.

During the course of my practice, it has happened not infrequently that I have given false interpretations of roentgenograms. I have often assumed the presence of an ordinary disease, whereas it developed later that a rare and little known affection obtained. There have likewise been many cases in which I recognized at once from the findings that I should be unable to reach any definite diagnosis, and that therefore I should refrain from risking an opinion. That has occurred with reference to manifold diseases and to diverse regions of the body.

2. A good knowledge of roentgenology as applicable to medicine—not only general knowledge but also knowledge of the special field in question. I mean, more particularly, a knowledge of the manner in which diseases present themselves at the roentgenographic examination, as based on various considerations and on our observations and experiences. Here, too, great difficulties arise, especially by reason of the fact that at the roentgenographic examination the organs are presented only to a limited extent as shadow pictures of significant density. It must be borne in mind also that the roentgenographic examination cannot be expected to furnish anything more than relative evidence.

3. A good knowledge of roentgenology from a physicotechnical point of view; for example, as to the existence and the significance of the several kinds of rays in their various degrees of hardness and softness; furthermore, the mode of centrodivergent projection and the various forms of photo-

[1]Translated by Henry Riggs Wolcott, Chicago.

graphic procedure. A portion of the body projected by hard rays, while the object was moving, on poor, or poorly treated, roentgenographic films, with over- or under-exposure, will usually result in producing an almost useless roentgenogram. Nevertheless, one must frequently endeavor to reach a diagnosis from such a roentgenogram. Sometimes, in such instances, sketching of the contour lines will aid greatly.

These are some of the important principles that should be followed: The clinic and the roentgenographic laboratory must work hand in hand. The clinical and roentgenographic symptoms should be placed side by side, and one should give not merely a roentgenographic but a clinicoroentgenographic diagnosis. As a rule, a clinician should aid the roentgenologist; in any event, two persons should work together. Owing to the frequent need of other special examinations, it is often necessary for several physicians to collaborate. In the beginning of the diagnosis, one may have only a certain definite disease in mind, though an entirely different disease may be present. The roentgenologist must not, however, allow himself to be towed along by the clinician, but must emphasize the very great importance of his observations. If, in a given case, the diagnosis remains uncertain, in spite of all endeavors to arrive at the truth, the roentgenologist must admit not only to himself but also to his entourage that the diagnosis is uncertain, since such a frank statement is much to be preferred to the announcement of uncertain judgments. Under such circumstances, the best textbooks should be consulted, but one should keep ever in mind that, owing to the imperfect or incomplete status of roentgenology as a science, there are still some errors in the textbooks.

The roentgenologist should never be content with poor roentgenograms. If the first roentgenograms are not good, one should keep trying until good ones are obtained. Frequently, it is advisable to make both special roentgenograms and roentgenograms for a general survey, and not merely one or the other. One should examine not only the organs of the body that appear especially important but also other organs. After examining the abdominal organs, it is sometimes well to include the thoracic organs. Occasionally, it may be advisable to subject all parts of the body to a roentgenologic examination.

In a large percentage of cases, great caution is needed to avoid false diagnoses. However, it is not right that in so many cases the diagnosis should remain obscure. If the roentgenologist has a good knowledge of his specialty and wide experience, he will often be able to reach a diagnosis in cases that at first sight appear unfathomable.

It is desirable that the aforementioned pre-conditions be met by a single person. If that is not feasible, several investigators must collaborate and supplement one another, but, if a single one of the pre-conditions demanded is not complied with, the success and accuracy of the diagnosis will be jeopardized.

ROBERT KIENBOECK, M.D.,
Vienna, Austria.

THE ANNUAL MEETING

It is hoped that all members have made their reservations and have completed their plans to attend the Annual Meeting.

The officers of the Society have worked diligently to make this one of the best meetings the Society has ever had. The facilities offered for us at Milwaukee, both for the presentation of our scientific program and for our social entertainment, are, we believe, equal to the best the Society has ever had.

Our scientific program promises to be interesting as well as instructive. Representative men from all parts of this country, as well as an eminent roentgenologist from Europe, will discuss the problems we are all

interested in at the present time. An extended visit to the clinics of this country and Europe combined would hardly afford a more instructive post-graduate course than will be presented in our program within a few days' time. You are urged to take advantage of this opportunity to exchange views with your fellow-radiologists.

The strength of our Society depends upon its weakest link. Co-operation of the individual members strengthens the links that bind our organization together. We want, and need, you all.

Another one of the opportunities afforded by attendance at this meeting will be the contact with your fellow-radiologists. Such contact enables one to properly evaluate his own efforts and standing in radiological work. Therefore, Dr. Member, we shall expect you to be present at the Auditorium, Milwaukee, promptly at 1:30 P. M., Monday, Nov. 29, 1926, at which time the Scientific Session begins. We shall endeavor to keep your time fully occupied from that time until Saturday noon, Dec. 4, 1926.

CLARENCE WINFRED GEYER, M.D.: IN MEMORIAM

"The fear of death is the monopoly of young people. The man who has kept right at his work, living one day at a time and not bothering other folks more than he has to, doing each task the best he can, keeping an interest in all good things—that man is not afraid to die."

Doctor Clarence W. Geyer, of Milwaukee, died on October 10, 1926. Those of us who spoke to him in the last hours were admonished to *"Carry on!"* There was not the slightest note of fear, but a peaceful resignation to the inevitable.

His life was rich in service to humanity. Close inspection of his career shows an active, energetic mingling with human endeavor. He served his country during the late war,—the scars he bore, a mute testimony to his patriotism. These wounds left him incapacitated in many ways.

Church, clubs, and his professional work made numerous inroads on his leisure. The Scientific Exhibit is the work of Dr. C. W. Geyer—well planned, and all effort will be made to carry out his cherished ideas. What a stern reality of life that prevented him from viewing his contemplated handiwork!

Coming to Milwaukee in 1919, he very soon established an excellent roentgenological practice. He attracted people to him by his earnestness and capacity for work. He taught roentgenology at Marquette University and was incessant in his labors for roentgenology throughout the State. His creed might be summed up very briefly: "I believe that when I part with a man, I must do it in such a way that when he sees me again, he will be glad—and so will I."

Dr. Geyer was, comparatively speaking, a new man in the field of roentgenology. His general medical attainments were of immense value to him. He dreamed many things for the betterment of his chosen specialty. Deprived of an opportunity of earthly fulfillment, we are sure that he would have been glad to have his thoughts expressed in the following lines: "I believe in the hands that work, in the brains that think, and in the hearts that love."

We shall miss the warm friendliness of the man.

H. B. PODLASKY, M.D.

TRIBUTE TO THE MEMORY OF DR. RUSSELL D. CARMAN

The officers and Executive Council of the American Roentgen Ray Society on September 29, 1926, presented a bronze tablet as a tribute to the memory of the late Dr. Russell D. Carman. This ceremony took place in the lobby of the Mayo Clinic, at Rochester, Minnesota.

MILWAUKEE, THE HOST CITY

The week of November 29 to December 4 may well be anticipated with pleasure by the several hundred radiologists who are planning to spend that time in Milwaukee, in attendance upon the Twelfth Annual Meeting of the Radiological Society of North America. The Scientific Sessions in Plankinton Hall, Auditorium; the Scientific and Commercial Exhibits in the same building, will hold the attention of members and visitors throughout the week, with the Thursday night banquet and dance, at the Plankinton Hotel, as a brilliant social feature and a reunion of congenial acquaintances.

In addition to the earnestness of purpose which draws members and visitors to these Annual Meetings, there grow year by year social ties and community of tastes among radiologists and their families, so that many a congenial group will gather around dinner tables and seek relaxation in one another's company. And just there it will be found that the Committees knew Milwaukee's resources when they made promises of happy entertainment.

Court of Honor on Grand Avenue, Milwaukee

Half a block down a quiet street visitors out on a cruise of discovery of the city will find the Colony Inn, and the wise ones will promptly bespeak tables for dinner. The food is delicious, the service satisfying, and the surroundings quaint—not make-believe but really unique. It might be well to write the address on a blank page of the program—even scientists are not indifferent to good food. Colony Inn, 373 Milwaukee Street, Telephone Broadway 2450 (it may be convenient to reserve one's table for dinner, because Milwaukeeans appreciate it fully). Restaurants are to be found on every street, but there is only one Colony Inn!

The visiting ladies are going to exclaim with pleasure when they discover The Cook Tea Shop, on the second floor at 144 Mason Street, over the beguiling Watts shop. Speaking of tea, reminds one that the Colony Inn serves luncheon and afternoon tea, also, so that the ladies are offered an alluring choice of these good things. They say there just is no better food possible than Amelia and Marie Cook serve their guests—the men, too, will not be long in discovering

it, even though it is located in a quiet, aristocratic street at the opposite end of the business district from the Auditorium. Food such as the Cook Shop serves is worth traveling farther than a few blocks to find.

And that naturally suggests the aforementioned Watts shop—a paradise for shoppers. We would suggest it as a capital place to select a "souvenir of Milwaukee" for those at home who do not attend the meeting. Visit it as you would a gallery of beautiful objects—and the matter of making purchases will become a "dominant motive." There are numerous other shops up and down Milwaukee's streets—the city is extensive enough to offer metropolitan attractions and not huge enough to be bewildering. Just a comfortable size, Milwaukee is.

Of theatres, there is choice of the best of moving picture houses, vaudeville of the Orpheum Circuit, and drama at the Davidson Theatre.

They will tell visitors in Milwaukee that their city has a thriving, wide-awake suburb to the south that is well worth visiting as one passes through. That is a way they have of speaking of Chicago. Streetcars are augmented by bus lines and taxis, Yellow and otherwise. In whatever city the Radiological Society meets, its members have a way of promptly finding the best in the way of food and entertainment—the Local Committees look to that!

ANATOMY OF THE LIVING[1]

The visceral anatomy of healthy adults has been made a subject of study by R. O. Moody, W. E. Chamberlain and R. G. Van Nuys (*Am. Jour. Anat.*, May, 1926, XXXVII, 273). In view of the great variation in form and position of the stomach in living individuals, the great variation of the position of the pylorus and the marked change in the position of the stomach, plyorus, liver, transverse colon and hepatic and splenic flexures of the colon, caused by a change in the position of the body, the authors assert that the anatomy of the viscera, based on a study of the dead, loses much of its value and gives students many wrong concepts of visceral form, position and relations. The anatomy of the abdominal viscera should be taught as it is found in the living, not as it is found in the dead. To do such teaching and to carry on research every department of anatomy should have as a minimum equipment a fluoroscope and one instructor trained to use it. Apparatus for taking roentgenograms would add much to the value of the equipment.

[1]Reprinted by permission from *Bulletin of the Association of American Medical Colleges*, October, 1926.

LIMITATIONS OF ROENTGEN RAY IN DIAGNOSIS OF TUBERCULOSIS[1]

At a recent meeting of the Geneva Medical Society, Dr. Guillermin referred to some mistakes in diagnosis resulting from roentgen-ray examination in cases of suspected pulmonary tuberculosis. In pulmonary cysts or neoplasms, interlobar pleurisy and pneumothorax, the roentgen ray gives information of the greatest importance. In tuberculosis, roentgen-ray examination will reveal the signs of induration, cavities, adhesions and functional disturbances present in certain regions of the lungs. All these data are useful, but they must be properly interpreted. Injections of iodized oil are contra-indicated in tuberculosis.

Guillermin, after reporting five cases in which mistakes had been committed, pointed out that the prognosis of tuberculosis did not depend on the extent of the lesions or their degree. Everything depended on the resistance of the organism to the tuberculous infection. Old lesions, with or without cavities, are curable if a good general state of health is maintained. Clinically, recent

[1]Reprinted by permission from the *Journal of the American Medical Association*, Sept. 11, 1926, p. 864.

lesions with very marked roentgen-ray images have a good prognosis if the general health is good, but the inverse is true, especially if the roentgen-ray examination is negative. City children, when they have resisted a first tuberculous infection, develop a resistance superior to that of country children. Of course, many other factors are to be taken into account, especially complications, such as laryngitis and enteritis. On the other hand, Guillermin said that although roentgenologic examination gives many useful data, it alone is insufficient for making a diagnosis and especially a prognosis. The anamnesis and clinical and laboratory examinations are absolutely necessary for the physician in order to form an opinion of the case.

BOOK REVIEWS

SCOLIOSIS—ROTARY LATERAL CURVATURE OF THE SPINE. By SAMUEL KLEINBERG, M.D., F.A.C.S., Assistant Surgeon New York Hospital for Ruptured and Crippled, Member of American Orthopedic Association, Chief of Orthopedic Service, Israel Zion Hospital of Brooklyn, etc. Paul B. Hoeber, Inc., New York, 1926. Pages 311. Price $6.00.

In presenting this book the author has well accomplished his purpose of presenting a concise and comprehensive review of the experience gained during the past few decades in regard to scoliosis.

After a brief review of anatomical and physiological considerations and the classification and pathology, the author undertakes to present the difficult subject of the etiology of scoliosis. This is perhaps the most discussed part of the subject, as it always has been. If there could be a more general agreement on this phase of the subject, all that follows in regard to treatment would be comparatively simple. One is surprised that the author does not consider anterior poliomyelitis to be a rather common cause.

The evolution in treatment is clearly stated and well illustrated. Though nothing new is presented, under operative treatment the author describes the Hibbs, Albee and Forbes operations, and states that his own operation combines the technic of all three methods. The beef bone graft is used and the author claims to have had no difficulty with these grafts. This experience, however, fails to agree with that of many other equally competent operators. In fact, it is difficult to understand wherein there is any advantage gained over the beautiful technic and splendid results obtained by the Hibbs method. Without question a larger percentage of severe scoliotic spines will be operated on in the future.

The book is readable and interesting and should be distinctly helpful to the clinician and surgeon.

A. G. HOWARD, M.D.

ERGEBNISSE DER MEDIZINISCHEN STRAHLENFORSCHUNG, Band II. Leipzig, 1926, Georg Thieme.

This is the second volume of a series of monographs on various aspects of radiology which have been appearing during the past year. Each monograph is by a specialist and is intended to cover the subject thoroughly and comprehensively. This volume keeps up the high standard established by the initial contributors.

The first two sections, by Jüngling and Peiper, respectively, cover the subjects of Ventriculography and Myelography. Together, they form a monograph of almost two hundred pages. The text goes into great detail about every aspect of the problem, including anatomy, physiology, pathology and surgery, as well as the strictly radiographic aspects. I do not know of any publication on this subject which has attempted to compass the ground so com-

pletely and comprehensively as do these two contributions.

The next paper, by Fleischner, on "Interlobar Pleuritis and Its Differential Diagnosis," is of equally high standard. It is a correlation of a number of publications which have appeared during the past two or three years in various Continental journals. The importance of making a diagnosis of interlobar pleuritis has not apparently penetrated the literature in this country so thoroughly as it should. Fleischner goes into great detail regarding the anatomy and pathology of the interlobar fissures and describes several novel ways of utilizing the X-ray examination, particularly his own device of examination with the patient in the position of extreme lordosis. A clever scheme is used in the reproductions of the chest films that are taken in the lateral and oblique projections. Underneath every one of them is a tiny sketch with an arrow which shows the exact angle of projection of the central X-ray. This figure takes up almost no space but explains much more than many lines of text would do.

Berg, of Frankfurt, contributes a paper on "The Roentgen Symptoms of Duodenal Ulcers," and this is accompanied by many extremely beautiful half-tone cuts and plates. The author has worked along the same lines previously developed by Åkerlund, of Stockholm. Every aspect of the problem of duodenal ulcers has been thoroughly considered and described.

Kroetz contributes a short paper on "The Influence of Short Wave Rays on the Alkali-acid Equilibrium of the Body, with Particular Reference to Blood Reactions."

There is a short article on "The Radiation Treatment of Bronchial Asthma," by Klewitz. This author has had an unusual experience in his particular field, and his contribution is filled with the weight of authority as well as literary investigation.

Geller contributes an article on "The Results of Experimental Radiation of Ovaries." This is a highly technical, scientific contribution, the result having distinct application to clinical radiology.

An article on "Endovesical Coagulation," by Scheele, shows a field of treatment which is apparently finding favor rapidly among German surgeons. Scheele gives a very thorough description of methods as well as apparatus for the treatment and considers not only the treatment of cancer but many other lesions such as tuberculosis, simple ulcers, leukoplakia, angiomas, etc.

In Schempp's paper, entitled "Roentgen and Radium Treatment of the Tongue," is given a very thorough review of all the various types of treatment which have been employed in this field.

Altogether this volume is a worthy follower of the initial one in the series. The contributions are all by men well versed in their subjects and are thoroughly readable. From an American point of view the entire group of monographs is especially interesting because in practically every one of them the bibliography gives adequate credit to American contributions in the respective fields. This is a refreshing novelty, as in the past similar German publications have been notorious for their neglect of everything but purely German literature.

ISAAC GERBER, M.D.

LA CYSTOGRAPHIE, ETUDE RADIOLOGIQUE DE LA VESSIE NORMALE ET PATHOLOGIQUE. By H. BLANC and M. NEGRO, du Service Civiale (Hopital Lariboisiere, Paris). Masson et Cie, Paris. Pages 189, price $3.50.

This volume presents a most excellent and comprehensive treatise of all phases of cystography arranged in a clear and concise manner.

A chapter on radiographic technic clearly describes the essentials for such work. The chapters on normal and abnormal cysto-

grams are profusely illustrated by one hundred and eight excellent radiographs and explanatory drawings. These so clearly portray the various conditions that a knowledge of French is not wholly essential for an appreciation of the material presented.

This book will be of interest and value to all those associated with this phase of radiography.

J. D. CAMP, M.D.

INJURIES OF THE WRIST: A RADIOLOGICAL STUDY. By the late DR. ETIENNE DESTOT, Lyons. Translated by F. R. B. ATKINSON, M.D.C.M., Edinburgh University. Paul B. Hoeber, Inc., New York, 1926. Pages 176. Price $6.00.

This comprehensive treatise on injuries of the wrist is the result of most careful clinical and radiological studies made by the author over a period of about twenty years. The accuracy and detail attending such observations are reflected in the descriptions and opinions recorded by the author.

There are eight chapters, arranged in the following order: (1) Anatomy and Physiology of the Wrist; (2) Sprain and Subluxation of the Scaphoid and of the Semilunar; (3) Fracture of the Scaphoid; (4) Fracture of the Semilunar; (5) Dislocation of the Carpus; (6) Fractures of the Other Bones of the Carpus; (7) Radiocarpal Luxation; (8) Fractures of the Lower Extremity of the Radius. The text is illustrated by eighty-seven figures, about one-half of which are drawings. A comprehensive bibliography is included.

This work is without doubt a most valuable contribution to the subject of wrist injuries and provides, for such, a dependable source of reference. The time and patience consumed in following to an end the many lengthy descriptions in a style of expression characteristic of many Continental authors will be well spent.

J. D. CAMP, M.D.

ABSTRACTS OF CURRENT LITERATURE

Total thyroidectomy.—These authors, impressed by the failure of the usual surgical measures to bring about the desired results, have resorted to total thyroidectomy in selected cases, chiefly in those where there has been long suffering and where the patient has become completely incapacitated. Following total thyroidectomy, it is necessary that the patient have thyroid extract the remainder of life, the dose varying with the individual. The necessary dose can be determined by basal metabolic determinations.

They report ten cases, with uniformly good results, all the patients, previously completely disabled, being restored to health and able to resume daily occupations.

W. W. WATKINS, M.D.

Total Thyroidectomy in Thyrotoxicosis of the Exophthalmic Type: A Preliminary Report. P. K. Gilman and W. E. Kay. Am. Jour. Med. Sci., February, 1926, p. 239.

Study of carcinoma of colon.—Diagnosis should be made early before metastasis has occurred, hence an effort was made in studying these 60 cases to determine the manifestations which should make an earlier diagnosis possible.

Incidence as to age and sex:—Thirty-three cases, or 55 per cent, between the ages of 40 and 60, and 20, or 33 per cent, in persons of 60 or older. Three patients were under 30, one 23, one 26 and one 27. Males predominated in this series: 42 males and 18 females.

Manner of onset was gradual in two-thirds of the cases, with an average of nine months before coming to the hospital. Sudden clinical onset, with signs of obstruction, occurred in nineteen cases.

Symptoms and signs:—Most certain was the finding of a definite tumor mass, but this is a late sign and usually means that it is inoperable. Persistent constipation, with more or less obstruction, is a sign. Diarrhea alone was present in six cases. Blood in stools always important. Occult blood was found in 21 cases; none in 9, and no examination in 30. Vomiting was a symptom in 31 cases; however, nothing was noted as distinctive in the vomiting.

Location of lesion:—In 31 cases in sigmoid, 12 in cecum, 8 in right colon, 5 at splenic flexure, 3 in transverse colon, and 1 at hepatic flexure.

Roentgen examination absolutely essential, best by means of barium enema, though valuable information may be obtained by study of the passage of the barium meal.

Two signs almost pathognomonic of colon malignancy:—One, presence of obstruction, with palpable mass at the site; two, a definite, persistent filling defect within the bowel. Proximal dilatation and the accumulation of gas are valuable signs.

Treatment is surgical unless the condition is manifestly inoperable.

C. H. DEWITT, M.D.

Carcinoma of the Colon: A Study of 60 Proved Cases. Karl A. Meyer, William A. Brams and Julius Brams. Ill. Med. Jour., August, 1926, p. 152.

Keloids.—The author writes in a whimsical mood, noting that the treatment of keloids by radiation is a unique instance of unanimity of opinion. True, some writers advise the use of filters while others do not, and radium is preferred to roentgen rays by some, but there is almost universal agreement as to the beneficial effects of radiation, though the technic may vary in the hands of different radiologists. The author's own method, based upon extensive consultation of the literature and fifteen years' practice—including experimentation with all technics—is to employ unfiltered roentgen rays. He states that he has not used radium in enough cases to warrant him in drawing conclusions. He says: "The four cases in which I have used radium were all treated with gamma radiation through a 1 mm. brass filter. Only one of the four was benefited by this treatment. McKee states that beta radiation should be used for small lesions and gamma rays for thick lesions, while Simpson uses a plaque screened with 0.1 to 1 mm. of lead which would transmit only a small percentage of beta rays."

Grier classifies his cases as to what, in his judgment, constitutes a "cure," the technic

used, and the number of treatments given. He says: "The gradual conviction that cases treated with thin filters showed the most improvement led me to the use of 1 mm. of aluminum as a filter, and finally to the omission of the filter entirely." Of the time allowed to lapse between treatments he writes, still in a facetious mood, "The best result I have had was in a patient who never came back when he was told and whose average interval between treatments was three and a half months."

In estimating the erythema dose, he says, "It is absolutely essential to consider the size of the area treated." He continues: "The factors which I use in the treatment of keloids by unfiltered radiation will produce a faint erythema in an area ¼ inch square in seven minutes, and a similar reaction is produced in an area 2 inches square in three minutes. The majority of keloids will vary in size between these limits, and I attempt to judge the dose accordingly. When making this estimation, it is better to under-dose than over-dose, as severe reactions are undesirable and, I believe, unnecessary."

Following the paper is a lengthy discussion by representative men.

The Roentgen-ray Treatment of Keloid. G. W. Grier. Am. Jour. Roentgenol. and Rad. Ther., July, 1926, p. 22.

Duodenal ulcer.—The incidence of this lesion is shown to be 56 out of 100 cases of gastric or duodenal disease, in the records of the Mayo Clinic covering a period of several recent years; hence, the roentgenologic importance of the duodenal niche, "one of the most interesting signs of the disease." The credit of finding and describing this sign is traced through Haudek (1911), Reiche, Lewis Gregory Cole (1914), Carman (1916), Akerlund (1919), Diamond, Chaoul, Bier, von Bergmann, Holzknecht, George and Gerber, Strauss, Schlesinger, and Goldammer, and others unnamed.

Of "the varying incidence of the niche in the experience of different examiners," the authors present the following explanation: "Difference in technic, in the conception of what constitutes a true niche, and in the effort to demonstrate it as such. Another factor, which should not be overlooked, is the class of patients sent for roentgenologic examination. In some clinics only those patients with a clinical diagnosis of ulcer are referred to the roentgenologist. Such patients have older lesions and are likely to have ulcers sufficiently large to produce a visible niche. In other clinics all patients having abdominal complaints, however vague, are examined with the roentgen ray, and among these there will be patients with early duodenal ulcer which is incapable of producing a visible niche, although the spastic bulbar distortion is diagnostic."

Since duodenal ulcer produces a niche smaller in all dimensions than gastric ulcer, only the most exact technic and closest observation—employing both roentgenoscopy and roentgenography—will succeed in discovering it. A technic sufficiently exact to reveal the presence of ulcer may yet fail of showing a niche. "When the diagnosis of ulcer is obvious from bulbar deformity, or from retention and hyperperistalsis in a large but otherwise normal stomach, many examiners regard it as superfluous to seek for a niche," the authors conclude.

They describe their technic for examining for niches, and illustrate it fully. This is the paper by which Dr. Carman was represented on the program of the Detroit meeting of the American Roentgen Ray Society, a short time previous to his death.

The Duodenal Niche. Russell D. Carman and Charles G. Sutherland. Am. Jour. Roentgenol. and Rad. Ther., August, 1926, p. 101.

The erythema after ultra-violet radiation.—This paper gives the report of some investigations as to the nature and character of the erythema of the human skin after exposure to ultra-violet radiation. Certain types of erythema curves are grouped; the rôle of the color of eyes, hair, and skin in regard to the susceptibility to ultra-violet rays is discussed. It seems that only the properties of the skin

have any bearing on the degree of the erythema. For further details, a study of the original is recommended.

E. A. POHLE, M.D.

Regarding the Biology of Ultra-violet Light. III. The Reaction of the Human Skin to Ultra-violet Radiation (Erythema Curve). L. Schall and H. J. Alius. Strahlentherapie, 1926, XXIII, 161.

Histopathological findings in carcinoma.—The authors review the attempts which have been made by various investigators "to correlate the histopathological findings with the clinical prognosis," and present a classification based upon the general structure of the tumor and not upon the cellular origin of the particular type of cell predominating in the malignancy. Their classification is as follows:

A. Primary solid carcinomata.
   1. Spinous cell carcinoma with cornified pearls.
   2. Spinous cell carcinoma without cornified pearls.
   3. Round cell carcinoma.
   4. Spindle cell carcinoma.

B. Glandular carcinomata.
   1. Malignant adenoma.
   2. Papillary and gelatinous adenocarcinoma.
   3. Adenocarcinoma.
   4. Solid adenocarcinoma.

Descriptions of the cellular structure of each group follow, illustrated by micrograms.

The authors have attempted to evaluate as many factors as possible in their histological preparations and have found that for purposes of numerical expression certain values could be given to definite degrees of deviation from the average cell types present in the tum The nine factors determined upon are as follows:

1. Special cell type of carcinoma.
2 and 3. Irregularities in size and shape of the cells.
4. Distinctness in outline of the cells.
5. Functional activity of cells.
6 and 7. Irregularities in the size and shape of the nuclei of the cells.
8. Staining quality of the nuclei.
9. Number of mitoses and prophases.

Of possible variations in these classifications the authors say: "We shall undoubtedly add other factors and most probably omit some of the ones we have reported here, but we feel that it is only by pursuing such careful, painstaking work—omitting nothing that might possibly be of value—that real progress can be made." They are now engaged in evaluating radiation sensitiveness of carcinomata of various types and they find that the above enumerated nine factors are too incomplete to express the changes that take place. Results of the work upon which they are now engaged will be published in a later pap undoubtedly.

The conclusions arrived at are summarized as follows:

The cell types, the differentiation, and the anaplastic changes of carcinomata of the cervix have been studied. They have been given numerical values, the sum representing the histological malignancy index.

Immaturity of the cells, a low degree of differentiation and a high degree of anaplastic changes are invariably associated with a hig malignancy index.

The greater the maturity of the cells, the higher the differentiation and the less the anaplastic changes are, the lower will be the malignancy index.

The clinical malignancy of a carcinoma depends solely on the results of treatment obtained, provided the same method of treatment is used in each case. The extent of the carcinoma influences the outcome then only if it has thereby become a systemic or generalized disease. A carcinoma contained within a well defined area and having a low malignancy index offers every hope for a relatively good prognosis.

Comparing the histological malignancy index with the clinical findings or grouping of the carcinomata and excepting the Group 4 cases, it is found that a definite relation between the two does not exist. ("Group 4. The advanced carcinoma with fixation of tissue and widespread extension, distant metastases, and so forth. . . . The Group 4 cases

are absolutely hopeless from a clinical standpoint, regardless of cell type or histological malignancy index.")

The relation of the cell type to the histological malignancy index is definite. . . . The unripe cell type is almost always associated with a high malignancy index.

The relation of cell type to the clinical result is not as definite as the relation of the malignancy index to the clinical result. The malignancy index shows a definite or proportionate relation to the result obtained from treatment.

Considering the relation of the malignancy index to the clinical result and excluding Group 4 cases, we may conclude that the pathologist can give definite information as to the degree of malignancy from a histological examination expressed in numbers of the malignancy index, enabling the clinician to choose those cases of carcinoma which may respond with fair prospects to radiation treatment.

The Significance of the Histological "Malignancy Index" for Prognosis and Treatment of Carcinomata of the Cervix Uteri. Henry Schmitz, Wilhelm Hueper and Lloyd Arnold. Am. Jour. Roentgenol. and Rad. Ther., July, 1926, p. 30.

Thymoma in a child.—A boy aged nine complained of sudden sharp pain in the chest. There was a history of previous paleness and languor and a hard dry cough. Rest in bed gave relief from the pain. A few days later, following the boy's taking part in a race, the pain returned in exaggerated form, with marked difficulty in breathing, and choking fits.

A radiograph revealed a shadow to the right of the sternum, high up and extending outward about three inches. The left border of the shadow blended with a density covering the whole left lung field.

In a few days the left chest began to bulge, and cyanosis and dilatation of superficial veins developed. Twenty-six days from the first examination by the physician the child died.

Autopsy showed a large tumor mass in the anterior mediastinum, occupying the greater part of the midportion of the chest cavity. The left lung was completely collapsed. The left pleural sac was distended with a large quantity of slightly turbid yellow fluid. Enlarged glands were found in the neck and mediastinum.

Microscopically the tumor proved to be a round-cell sarcoma. The section contained bodies which had all the appearance of the Hassall corpuscles of the normal thymus gland, suggesting that the tumor may have been implanted on a previous status thymolymphaticus.

L. J. CARTER, M.D.

A Case of Thymoma. James Miller. Can. Med. Assn. Jour., July, 1926, p. 810.

Roentgen examination for rectal cancer.—While digital and proctoscopic examination is of service and may determine the diagnosis, the author regards a thorough roentgen examination as indispensable. Proctoscopic and digital examination so irritate the rectum that the X-ray examination should not be done within twenty-four hours after such examinations. Preliminary preparation consists of castor oil the evening before and a cleansing enema prior to the X-ray examination. The pelvic bowel may be studied following a barium meal, enema, or both combined. The combination gives best results. The patient should be screened while the enema is filling the bowel. Palpation should be employed with abdomen relaxed and patient breathing through the mouth. Tube and screen should be shifted so that all defects and angulations can be carefully studied. Films should be made so that the location and character of the filling defect may be more accurately determined.

The most important sign is a definite permanent filling defect. Spasm, fecal material, gas, adhesions and extrinsic factors must be eliminated as sources of irregularity of bowel outline. In the colon the most common cause of obstruction is carcinoma. Even after it has been shown that there is a definite bowel lesion, differentiation must be made between

tuberculosis, actinomycosis, diverticulitis, syphilis, benign tumors of the colon, and carcinoma.

C. H. DeWitt, M.D.

Operability of Cancer of the Rectum. Charles J. Drueck. Ill. Med. Jour., August, 1926, p. 155.

Direct or indirect roentgen-ray effect.—The ionized air which is always present in X-ray treatment rooms may be responsible for some of the effects assumed to be due to roentgen rays. In order to investigate this problem, seeds and plants of *Vicia faba* and *Phaseolus vulgaris* were exposed to roentgen rays (80 K.V., 7 ma., 1.0 aluminum, 20–30 cm. F.D.) in a celluloid cylinder through which eleven liters of fresh air could be blown per hour. Controls were irradiated in the treatment room and exposed there to the influence of the ionized air. No difference in the injurious effects was noticeable. Other control series were undertaken by shielding seeds of plants from the direct radiation and permitting only the ionized air to come in contact with them. No change whatsoever could be detected in the growth or appearance. This seems to prove that roentgen rays themselves are responsible for the changes, and not the ionized air.

E. A. Pohle, M.D.

Does Roentgen Radiation Itself or the Air Charged by the Rays and High Potential Cause the Biological Effects? H. Koernicke and A. Kuster. Strahlentherapie, 1926, XXIII, 155.

Breast cancer.—This article is a résumé of breast cancer treated surgically, after a ten-year period of observation. Cases observed for five years showed, living and free of recurrences, 34 per cent. Observing these same cases five years longer showed only 17 per cent still living and free of recurrence. The material in this article teaches that cancer cases cannot be labeled "well" even after ten years of freedom from recurrences. The majority of deaths are due to metastasis rather than to reappearance of disease at the original site, indicating necessity of careful search for metastasis at time of operation.

S. C. Barrow, M.D.

Late Results after Amputation of the Breast for Carcinoma. Alexis V. Moschcowitz, Ralph Colp and Percy Klingenstein. Ann. Surg., August, 1926, p. 174.

Congenital syphilis. — The author describes the methods used in the diagnosis of maternal and infantile syphilis at the Universitats-Frauenklinik, at Hamburg, together with some results of treatment. Serological examination is made of retroplacental blood and of blood taken from the umbilical cord at birth. If either gives a positive Wassermann reaction the maternal blood is again examined before the patient's discharge from the clinic about the tenth day; non-specific reactions, which are not uncommon in non-syphilitic subjects at term, are thus detected. A second examination of the child's blood at this time is held to be unnecessary; a second negative test does not disprove syphilis, for frequently a positive serological finding is not shown until the later appearance of clinical symptoms. Similarly, a second positive Wassermann reaction is not necessarily a proof of syphilis, and may be replaced in the course of a few weeks by a negative reaction.

Great reliance, on the other hand, is placed on X-ray examination of the infant's extremities, which is made in the ninth week in every case in which there is a suspicion, on serological or clinical grounds, of congenital syphilis. Radiographic detection of bony syphilis is considered conclusive, and renders further blood examinations unnecessary. If X-ray signs are absent, however, the mother's and child's bloods are again tested, and a positive result is taken to justify anti-syphilitic medication.

The radiographic signs of congenital syphilis are those of (1) osteochondritis, with irregular increase of the calcification in the epiphyseal cartilage—most common in the femur, tibia and fibula, radius and ulna, or humerus,

in the order named; or (2) ossifying periostitis of the long bones.

In about one-fifth of the author's cases it has been possible to trace for periods of from two to five years infants suspected of syphilis at discharge from the lying-in home. Of these, more than one-half showed signs of syphilis, either clinically or as indicated by late development of a positive blood reaction, or by radiographic examination of the long bones. With regard to the effective treatment, Nürnberger, collating his own cases with those reported in the literature, finds that 85 per cent of syphilitic mothers treated during pregnancy gave birth to healthy children, as compared with 41 per cent of untreated.

Diagnosis of Congenital Syphilis in Infants. L. Nurnberger. Zentralbl. f. Gynak., March 20, 1926, p. 705. (Reprinted by permission from Brit. Med. Jour., July 17, 1926, p. 13 of Epitome of Current Medical Literature.)

Bifurcate ribs.—This condition is uncommon, only two such cases being recorded previously as recognized during life. These were demonstrated by Dennis during routine fluoroscopic examination of a large number of recruits.

The author reports the details of another case which has come to his attention. A boy, aged four years, complained of a lump in his chest. Physical examination revealed nothing except a round prominence of the chest, about two and a half inches in diameter, at the level of the third rib just to the right of the sternum. It was firm and hard and not tender.

A radiograph revealed a bifurcation of the ribs on the right side, the third and fourth being the ribs involved. Each rib was bifurcated at the sternal extremity. The resulting prongs of the third rib ran parallel, while those of the fourth produced a marked "Y" effect.

This case is unusual in that it is the first reported where there was a bifurcation of more than one rib.

Such deformity of the chest as instanced in this case is often classed, on a superficial survey, as rachitic in origin. Routine fluoroscopic and radiographic examination will show, as in this case, that the condition is not of rachitic origin.

L. J. Carter, M.D.

Bifurcate Ribs,—an Unusual Cause of Deformity of the Chest. M. W. Bloomberg. Can. Med. Assn. Jour., July, 1926, p. 807.

Epiphysitis.—A review of the development of the epiphyses stresses the fact that they derive their nourishment, not from the diaphysis, but from a periosteal network of vessels quite independent of the shaft.

The various more or less common forms of epiphysitis, Legge-Calvé-Perthes disease of the hip, Osgood-Schlatter's disease of the epiphysis of the tibial tubercle, Köhler's disease of the tarsal scaphoid, Köhler's disease of the second metatarsus, and the vertebral epiphysitis, are described, and the epiphyseal changes common to all, consisting, as seen on the film, of irregularity of outline, flattening, fragmentation, and increased density, are detailed as they occur in each of the anatomical situations mentioned.

Since the article is in itself a review, and an extremely concise and able one, of the authoritative literature on the diseases dealt with, it does not lend itself to abstracting, but should be read in full.

Charles D. Enfield, M.D.

Osteochondritis, or Epiphysitis. Arthur C. Christie. Jour. Am. Med. Assn., July 31, 1926, p. 291.

Apophysitis of the os calcis.—All epiphyseal disturbances occur in the period of greatest growth of a child, between the ages of 6 and 17. In this condition the onset is gradual, the heel becomes red, swollen and tender, with pain at the attachment of the Achilles tendon to the os calcis. The X-ray reveals typical flattening or thinning of the epiphysis, with absorption of parts of it. The areas of decalcification are typical and can best be il-

lustrated by comparison with the other foot. As a rule, the disturbance is unilateral.

W. W. WATKINS, M.D.

Apophysitis of the Os Calcis. John T. O'Ferrall. Sou. Med. Jour., July, 1926, p. 549.

Method of diagnosis of cranial syphilis.—The authors publish a series of radiographs of the vault of the skull showing various syphilitic lesions of the internal table. These lesions take three forms—gumma, ulceration, and hyperostosis, singly or in combination—and the authors describe the different radiographic appearances of each type of lesion. Nine radiographs, with diagrammatic outline, are given to illustrate the various types, and details are supplied of several cases much improved by specific treatment, where, with a negative Wassermann reaction and doubtful syphilitic history the radiograph revealed a definite lesion of the internal table. In many cases epileptic fits, hemiplegia, and persistent headaches were recognized as due to osseous lesions of the internal table, and in some cases were quickly relieved by specific treatment.

The radiographic procedure for displaying lesions of the vault differs from that required for the base of the skull, films being taken in various positions of flexion and extension of the head. The authors believe that a valuable aid to diagnosis is provided by their method.

Radiodiagnosis of Late Cranial Syphilis. A. Leri and P. Cottenot. Presse Med., June 26, 1926, p. 801. (Reprinted by permission from Brit. Med. Jour., Sept. 11, 1926, p. 35 of Epitome of Current Medical Literature.)

The spine.—The large number of variations and anomalies of development of the spinal column makes it difficult in many instances to differentiate the pathological from the anomalous; thus a knowledge of these is essential. In any study of the abnormal, we must have a full understanding of the normal. To determine the number of vertebræ it is necessary to radiograph the entire spine. Failure of the posterior arch to fuse is most common in the seventh cervical, first dorsal and fourth and fifth lumbar. Other anomalous conditions discussed are supernumerary vertebræ, failure of the ends of the transverse process to unite, sacralization of the fifth lumbar, long transverse process of the first lumbar, etc.

When the individual is between 35 and 40 years of age lipping is noted at the borders of the intervertebral spaces, most marked in individuals of the heavy, stocky type, infrequently in those of slender build. After 45, practically all individuals of the stocky build show signs of hypertrophic arthritis in varying degrees. At 55, only a small percentage of even the slender type escapes these changes.

The author calls attention to arthritis of the articular facets, which is most difficult to demonstrate with the X-ray. A common cause of arthritis is tuberculosis. Many diseases of the spine are briefly discussed, including Charcot joint, actinomycosis, and metastatic carcinoma.

Fractures may involve any of the vertebræ. Rare in children, they occur most frequently between the ages of 20 and 40, and more commonly in males. Cervical fractures have the highest mortality. Although cord symptoms may completely disappear, injuries to the bodies, except where very slight, will probably always be demonstrable. Fractures of the transverse processes of the lumbars are due oftener to indirect violence or muscular action than to direct violence. Incomplete X-ray exploration of the spine is deplorable, because it may give a false sense of security.

F. B. SHELDON, M.D.

Anomalies, Diseases, and Injuries of the Spine. James P. Kerby. Calif. and West. Med., August, 1926, p. 196.

Experimental resection of joints.—A series of experiments on rabbits, controlled by roentgen-ray measurements of the bones before and after resection, leads to the conclusion that joints can be resected in growing individuals without interference with subsequent attainment of normal length of the involved bones. To accomplish this result it is necessary to avoid injury to the epiphyseal

cartilage plate, either directly, or by interference with its blood supply.

CHARLES D. ENFIELD, M.D.

Growth Disturbances Following Resection of Joints. S. L. Haas. Archiv. Surg., July, 1926, p. 56.

Roentgen treatment of sycosis.—This is a plea for not using the so-called epilation dose in the treatment of sycosis and trichomycosis because of the danger of late reaction. Furthermore, the author has observed much better clinical results when administering one-fifth to one-third to one-half *X* through one to three millimeters filter (material?), two to three times a month.

E. A. POHLE, M.D.

Sycosis Barbæ and Roentgen Epilation. F. Thedering. Strahlentherapie, 1926, XXIII, 143.

Electro-desiccation and electro-coagulation.—The purpose of the paper is to record the more or less limited experiences of the author, in the hope of stimulating the interest of other physicians in these therapeutic agents. His own results have been encouraging. He discusses the principles of the electrical apparatus and the manner of its use. The applicator, usually an ordinary sewing needle, is fastened in an applicator having a rubber handle, and in contra-distinction to the actual cautery, which is hot and chars with only superficial penetration, this metal point remains cold, the heat being generated in the tissues and to any depth desired. The cell destruction is proportional to the strength and kind of current used.

Desiccation will thoroughly destroy local skin lesions with the minimum resulting scar formation. The heat is of moderate degree, but sufficient to completely evaporate all the water in the tissues treated. The curet may be used in conjunction with the desiccation or not, depending on the cosmetic results wanted. Over-treatment is a mistake most of us make at the beginning and must be guarded against, as destruction goes beyond its apparent limits. Coagulation, on the other hand, causes a more intense and penetrating heat than desiccation, so that in addition to dehydration there is also coagulation of the cell protoplasm. This mode of treatment requires an indifferent electrode as well as an active. After once treating with coagulation there is no contra-indication to treatment of a recurrence in the same field. This is the best treatment for highly malignant melanocarcinomas of the skin. It is applicable to many of the skin lesions.

F. B. SHELDON, M.D.

Electro-desiccation and Electro-coagulation as a Means of Destroying Benign and Malignant Skin Lesions. Ernest K. Stratton. Calif. and West. Med., August, 1926, p. 192.

Sinus infection.—For many years the importance of diseased tonsils and adenoids in children has been recognized: paranasal sinus infection is of equal importance but not so commonly looked into. That sinus disease occurs with considerable frequency in children, there can be no doubt. Attention to such infection has been followed by prompt relief: it may have constituted an active focus of infection. Conditions in which sinus infection has been noted as a contributing focus are: cardiopathies, rheumatic fever, chorea, nephritis, pyelitis, certain cases of cyclic vomiting, deforming periarthritis, anemia, anorexia, malnutrition, and chronic digestive disturbances. It seems to produce greater constitutional reaction than in adults. It gives rise to either very vague local symptoms or may be manifested by a long array of widely varying symptoms. Attention is called to a class of cases of masked mastoiditis where the symptoms are mostly of gastro-intestinal origin and are very severe—causing death if the confined pus in the mastoid is not soon relieved. It is not sufficiently appreciated that confined infection in infancy may cause such an acute disturbance, with symptoms almost wholly referable to the gastro-intestinal tract and frequently leading to death if the infection is not found and treated adequately; nor is it appreciated that such infection usually is located in connection with the upper respiratory tract. Several instances are reported in which

death in infancy seemed to be due to sinus infection exclusively.

L. R. SANTE, M.D.

Paranasal Sinusitis in Infants and in Young Children. Philip C. Jeans. Am. Jour. Dis. Child., July, 1926, p. 40.

Differentiation between types of megalo-ureters.—To differentiate the primary from the acquired type four characteristic features of the cysto-ureterograms in the former type are mentioned: (1) The bladder is enlarged and shows increased capacity; (2) There is no evidence of obstruction in any part of the tract; (3) The filling of the ureters is complete and bilateral, but reflux from the bladder; (4) There is no line of demarkation between bladder and ureters. In making these cysto-ureterograms there is no need of catheterizing the ureters as simple injection of the bladder suffices to fill even the kidney pelvis.

Various embryologic explanations of this condition have been offered, but none of them seems to explain it quite satisfactorily. As seen in the roentgenogram it is characterized by enormous and practically symmetrical dilatation of the ureters, which may attain the size of the adult small intestine, with a bladder shadow, and kidney pelvis shadows not necessarily abnormal.

CHARLES D. ENFIELD, M.D.

Primary Congenital Megalo-ureters. J. S. Eisenstaedt. Archiv. Surg., July, 1926, p. 64.

Anencephaly.—Before the onset of labor the careful clinician will suspect the presence of anencephaly. It remains, however, for the X-ray examination to establish the presence of this anomaly. The rounded shape of the normal fetal head is constantly absent. In all, the authors have reported six such cases—four diagnosed before labor. In each case the diagnosis was based upon atypical physical findings plus the proof furnished by the roentgenogram, and verified by operation. These four instances represent all the cases of anencephalus which entered this clinic prior to the onset of labor (since 1915). Two other patients, who were not seen until labor was well advanced, were found with anencephaly, but the diagnosis was already evident from the appearance of the presenting deformed head when the patients were first seen.

A brief review of the literature shows that without the roentgen examination it is possible to do no more than conjecture the presence of anencephaly. It is, therefore, reasonable to urge a routine roentgen study of all obstetrical cases presenting hydramnios, when there is difficulty in identification of the fetal poles, or when the fetal heart sounds are weak or uncertain. With the aid of the X-ray it is possible to state definitely whether or not there exists an anencephalus. There is given a brief review of the cases of anencephaly thus far reported in the literature, successfully recognized before the onset of labor.

Anencephaly represents only a relatively small proportion of fetal monstrosities, and the monstrosities represent only a small part of the field of usefulness of the roentgen ray in obstetrical practice.

L. R. SANTE, M.D.

The Early Diagnosis of Anencephalus. James T. Case and John E. Cooper. Surg., Gynec. and Obst., August, 1926, p. 198.

Neoplasms of the prostate.—This study was based on 1,000 cases of carcinoma of the prostate, from the Mayo Clinic, and was undertaken to determine most frequent symptoms, duration, complications, and more facts concerning metastasis and ultimate outcome with varying modes of treatment. Approximately one-half the cases were between 60 and 70 years of age: neoplasm of the prostate occurring in an individual under 40 years of age is very rare and is in most cases sarcoma. Frequency and difficulty in urination are the first symptoms of which complaint is made. Next symptom to be noted is pain, usually in back and thighs, probably arising from metastasis. Retention, a common sign of benign hypertrophy, was very infrequent in this series. Gross hematuria was not noted in this series.

In 485 cases, where no form of treatment was given, the average duration of the disease from the first symptom to death was 31 months. When metastasis had occurred at time of first examination, the average length

of life thereafter was 9 months; if metastases could not be demonstrated, then the patient lived for a year. About one-fourth had metastases, 44 per cent of which were on the lymphatics. The prostate is rich in lymphatics: first, those around the gland are involved; later, the lymphatics about the pelvic vessels, then lumbar and finally even cervical glands. Eleven per cent showed this most extensive metastasis. Metastases to bones of pelvis and spine were most frequent—easily detected in the radiograph by their white, chalky appearance. Bone metastases occurred in one-fourth of the cases.

Osteitis deformans may produce a radiograph at times indistinguishable from malignancy. The lungs were involved very rarely; therefore, in diagnosing metastases by roentgen-ray, examination of spine, pelvis and upper femurs would seem to be all that was necessary.

Surgical treatment.— In 164 surgically treated cases, the average length of life following operation was 30 months. On the face of the figures alone, this would seem to give three times the life expectancy than if no treatment were instituted. These figures include all cases where the diseased area was so small as to be recognizable only on microscopic study after the gland had been removed for benign hypertrophy. Even including these, there were 21 five-year cures in 164 cases. One would hesitate to recommend surgical treatment when the disease had advanced sufficiently to be positively diagnosed.

Radium treatment.—Radium rays, as first applied through the rectum, was most unsuccessful. Of the 35 patients so treated all but one are dead. With radium treatment on needles by the perineal route, of the 35 patients treated, only three survive; the average length of life was 16 months—very little longer than among those who received no treatment. More complete radiation by introduction of seeds into the gland through the urethra, combined with needles by the perineal route and surface radiation per rectum, with an average total dosage of 2,000 milligrams, resulted in average length of life of 22 months —about the same as surgery in selected cases. Except for selected cases, then, this method is not satisfactory. By the *combined method* of surgery with subsequent radiation of the operative field with radium, constant supervision for any recurrence and immediate application of radium after the focus has been adequately exposed by perineal section, he finds the best results. Exact technic is not given, nor are any definite statistics available up to the present time.

L. R. SANTE, M.D.

Carcinoma of the Prostate: A Clinical Study of 1,000 Cases. Hermon C. Bumpus, Jr. Surg., Gynec. and Obst., August, 1926, p. 150.

Tumor of the palate.—The author describes the case of a man, aged 62, who had a large tumor of the palate which presented in both the nasal and buccal cavities and caused very considerable embarrassment in breathing and deglutition. It resembled a peritonsillar abscess in appearance, but there was no acute inflammation and it was quite soft and painless. The diagnosis of mixed tumor of the palate was made and an operation was performed to remove it. This was found to be very difficult as there was no capsule and no definite line of cleavage. Microscopically the portions removed were innocent in character and presented the typical appearance of a mixed tumor.

Six months later the patient returned with another large mass in the palate, but this time with induration and infiltration of malignancy. This newgrowth appeared to be growing very rapidly, was causing marked nasal obstruction and discharge, and giving rise to headaches. A circle of six needles of radium of a total mass of 28 mg. was buried around the tumor for nine hours, and the procedure repeated two days later. There was a considerable amount of reactionary inflammation, followed by necrosis and discharge of pus from the needle holes. The final result was the complete disappearance of the neoplasm.

The author considers that these tumors are absolutely benign so long as they remain encapsulated, but when the capsule degenerates and the growth becomes extracapsular, the

tumor takes on the characters of extreme malignancy.

Mixed Tumors of the Palate. I. A. Souchet. Rev. de Laryngol., d'Otol. et de Rhinol., July 15, 1926, p. 462. (Reprinted by permission from Brit. Med. Jour., Sept. 18, 1926, p. 40 of Epitome of Current Medical Literature.)

Rare case of favus.—The authors report a case in a native of Virginia who had always resided in America and in whom the first symptoms appeared at the age of 42. The scalp, right eyebrow, and beard at the angle of the jaw were involved. No fungus could be cultured. Scales and hairs soaked in 15 per cent potassium hydroxid showed abundant, branching mycelia and spores. The patient was given an epilation dose of X-ray. Beginning six weeks later, a 3 per cent ammoniated mercury ointment was applied to the scalp daily. At the time of reporting, all areas had healed except one on the nape of the neck which showed no mycelia or spores.

F. B. SHELDON, M.D.

Favus. Kendal P. Frost and George F. Koetter. Calif. and West. Med., August, 1926, p. 186.

Amenorrhea.—Rubin has found amenorrhea associated with sterility 74 times in 1,450 consecutive cases. There is some evidence that mild X-ray doses are useful therapeutically, and he has treated twelve patients thus, with nine subsequent pregnancies (75 per cent), whereas in untreated cases pregnancy occurs in only about 5.5 per cent. Of these nine patients only one aborted, the remaining eight continuing to full term and giving birth to normal children.

Irradiation of the ovaries resulted in the restoration of the menses in eleven out of the twelve cases, and it was found that irradiation of the hypophyseal area and of the thyroid appeared to be helpful, while tubal insufflation and endocrine therapy were additional aids to the X-ray treatment. In eight of the nine successful cases the ovaries were found to be definitely enlarged before treatment, and Rubin considers that careful examination should assist in selecting cases suitable for ovarian radiation. In the absence of ovarian enlargement, irradiation of the hypophyseal area or of the thyroid may be the better course, and should certainly precede ovarian irradiation.

The X-ray dose recommended for amenorrhea is 5 to 10 per cent of the skin erythema dose, but much depends upon the age of the patient, the apparatus used, and the dose needed to produce a skin erythema.

Sterility Associated with Habitual Amenorrhea. I. C. Rubin. Am. Jour. Obst. and Gynec., July, 1926, p. 76. (Reprinted by permission from Brit. Med. Jour., Sept. 18, 1926, p. 41 of Epitome of Current Medical Literature.)

Conditions due to exposure to radio-active substances.—There is an increasing literature relating to autopsy findings in cases where death has been directly traceable to exposure to radio-active substances. The cases reported are workers with these elements, exposed as no physician ever has cause to be, who employs the screened elements in therapeusis. One case, that of a male chemist, who "openly handled radio-active substances, often being exposed to the untubed radio-active elements," is reported in detail as to course of disease, tests made before death, autopsy findings, and histology. In this case the fatal anemia was proved to be of the regenerative type. In comparing their case with those reported previously the authors comment as follows: "The bone marrow is red, and shows erythroblastic regeneration, similar to that seen in pernicious anemia, and is similar to findings of Weil and Lacassagne [*Bull. Acad. de med.*, Paris, 1925, XCIII, 237; *Paris med.*, 1925, I, 133]. In the anemias reported by Mottram [*Arch. Radiol. and Electrother.*, 1920, XXV, 194], it will be noted that they were classified as aplastic pernicious anemias. A careful study of his cases, however, reveals that during life the blood picture often showed anisocytosis, with the presence of many macrocytes, polychromatophilia, etc. Evidence of regeneration was actually present, and in pure aplastic anemia these signs should be absent. Furthermore, there is no record that bone

marrow was examined, since no autopsies were performed. It is possible that these cases which are classed as aplastic pernicious anemia, all of which were chronic, may have had, at some time during their course, red regenerative bone marrow and were followed some time later by atrophy. In our case, the blood examinations showed distinct evidence of active marrow by the presence of an anisocytosis with many macrocytes, polychromatophilia and occasional nucleated red cells. The anemia is, therefore, not of the aplastic type. In addition, the bone marrow is pathognomonic of the regenerative type of anemia. The persistent low color index and the lack of a well developed macrocytosis is against pernicious anemia, as well as its rapid course, without remissions, and by the absence of gastro-intestinal symptoms, of glossitis and lesions, and no hemorrhages. It is true, he [the authors' case] showed a Babinski phenomenon on one occasion, which disappeared after transfusion. We have seen this present in severe secondary anemia."

The conclusions are such as may be deduced from a study of this case and the others on record.

Leukopenic Anemia of the Regenerative Type Due to Exposure to Radium and Mesothorium: Report of a Case. George S. Reiter and Harrison S. Martland. Am. Jour. Roentgenol. and Rad. Ther., August, 1926, p. 161.

Prognosis of skin cancer.—This paper deals with basal-cell epithelioma, squamous-cell epithelioma, Paget's disease and skin sarcoma.

The basal-cell epithelioma is the least malignant cutaneous newgrowth. Being locally malignant, it yields a high percentage of cures, over 90 per cent of those destroyed remaining cured. When recurrences do take place, it is due to failure to destroy the lower strata of cells, to resistant cells, to failure to destroy peripheral cells, or to failure to keep the patient under observation.

In squamous-cell epithelioma, occurring most frequently on the lip, the extremities, the genitalia or the tongue, the prognosis is not good, the only hope being in early recognition and immediate institution of radical treatment.

In Paget's disease the prognosis is good if dealt with radically.

Melanotic sarcoma of the skin metastasizes through the blood stream and usually by the time the first changes are noticed in the moles from which these tumors arise, the prognosis is hopeless.

W. W. WATKINS, M.D.

The Diagnosis and Prognosis of Skin Malignancies. Lester Hollander. Atlantic Med. Jour., March, 1926, p. 379.

Cerebral tumors.—The authors treated by X-rays eleven cases of cerebral tumor, all but one of which had been previously trephined. In six cases the diagnosis had been confirmed (in three by microscopical examination of the brain, in two by operation, and in one by X-rays). Of the five in which the diagnosis was not established one was probably a case of cortical epilepsy, and the other four showed on operation a considerably increased intracranial pressure, atrophy of the cranial bones being shown on X-ray examination. The results of treatment were as follows: Among the six cases in which the diagnosis of cerebral tumor was confirmed, two died, both from a glioma in the motor area. The other four were still alive from nine to twenty-four months after discharge from hospital. Of these, one was a case of myxofibrosarcoma of the right upper temporal convolution, in which recovery had apparently taken place with only slight defect of vision in one eye. The second case was one of tumor of the frontal lobe. On admission, X-rays showed an orange-shaped shadow and a defect of the frontal lobe. Recovery in this case had also apparently occurred, apart from blindness in the right eye, which was present on admission. The third case was an infiltrating tumor of the parietotemporal region (sarcoma or glioma?). The patient was healthy and free from symptoms two years later. The fourth case was a hemangioma of the precentral convolution, in which improvement was obtained. Of the five cases in which the diagnosis of cerebral tumor was not veri-

fied two made considerable improvement as the result of X-ray treatment.

The authors maintain that this treatment should be employed only when radical operation is not practicable, that is to say, in those tumors which cannot be localized or removed except partially. Even when the histological structure of the tumor is known, it is impossible to foretell whether the X-ray treatment will be of use or not, especially as the same tumor may show a different sensibility towards X-rays at different periods. The authors emphasize the necessity of trephining before X-ray treatment in all cases where signs of increased pressure are present; otherwise the rise of brain pressure caused by X-ray treatment may be fatal.

X-ray Treatment of Cerebral Tumors. H. Saethre and R. R. Jorgensen. Norsk Mag. f. Lægevid., June, 1926, p. 425. (Reprinted by permission from Brit. Med. Jour., Sept. 11, 1926, p. 35 of Epitome of Current Medical Literature.)

Recent developments in cholecystography.—The author emphasizes the diagnostic importance of recent developments in cholecystography following the introduction of the sodium salt of tetraiodophthalein. This dye, which renders possible a direct view of the gall bladder, reveals opaque stones and non-opaque ones when surrounded by bile; enables the position, shape, size and emptying power of the gall bladder to be ascertained, and gives some information about the liver function. Of the three methods of administration of the salt, intravenous, jejunal, and oral, the latter is the more generally used.

The preparation of the patient is important, a laxative being given two days beforehand and not on the day when the dye is administered. A radiograph should also be taken for purposes of comparison. About three hours after a light supper containing fats the salt is given in 5-grain capsules every fifteen to thirty minutes with plenty of water, up to an average dose of 40 grains for 150 pounds of body weight. No more food is taken until after a cholecystogram twelve to eighteen hours later, by which time the dye will have reached the gall bladder. A meal rich in fats is then given and the gall bladder will be seen to diminish perceptibly in from one and a half to two hours.

Eveleth uses kerasol capsules, which are treated to resist the acid of the stomach and to dissolve readily in the intestinal tract, so that the dye is taken up by the portal veins.

Essentials for success are accuracy of technic, excretion of the dye by the liver, patency of the hepatic, cystic, and common ducts, and ability of the gall bladder to empty and fill itself, concentrate the dye, and hold sufficient to give rise to a shadow. Contraindications to the method are obstruction of the common duct, extensive hepatic damage, marked diabetes, hyperthyroidism, arteriosclerosis, cardiac disease, hyperemesis, advanced hepatic cirrhosis, and pregnancy. Usually no reaction follows administration, but about 12 per cent of the patients complain of temporary nausea, vomiting or diarrhea.

Cholecystography. F. S. Eveleth. Boston Med. and Surg. Jour., July 22, 1926, p. 165. (Reprinted by permission from Brit. Med. Jour., Sept. 11, 1926, p. 35 of Epitome of Current Medical Literature.)

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